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**The interaction of musical sound waves and meridian energy : a pilot study in the development of an integrated systems model for the treatment of psychogenic stress disorders.**

Susan Tomkins  
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**THE INTERACTION OF MUSICAL SOUND WAVES AND MERIDIAN  
ENERGY: A PILOT STUDY IN THE DEVELOPMENT OF  
AN INTEGRATED SYSTEMS MODEL FOR THE  
TREATMENT OF PSYCHOGENIC STRESS DISORDERS**

**A Dissertation Presented**

**by**

**SUSAN TOMKINS**

**Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
of the requirements for the degree of**

**DOCTOR OF EDUCATION**

**February 1996**

**SCHOOL OF EDUCATION**



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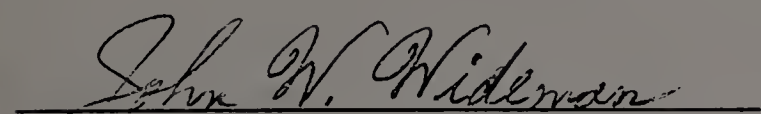
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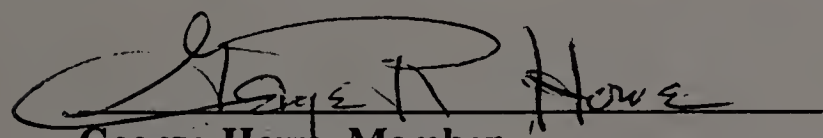
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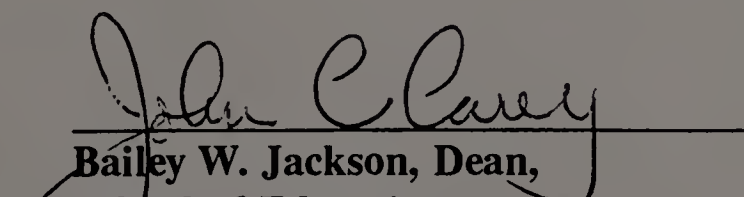
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## ABSTRACT

# THE INTERACTION OF MUSICAL SOUND WAVES AND MERIDIAN ENERGY: A PILOT STUDY IN THE DEVELOPMENT OF AN INTEGRATED SYSTEMS MODEL FOR THE TREATMENT OF PSYCHOGENIC STRESS DISORDERS

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The treatment effects of musical pitch and key are noticeably absent in music therapy research. The nature and patterns of the interaction between meridian energy and musical sound waves has received little or no attention in the music therapy literature and contemporary acupuncture literature. Forty-three acupuncture patients were treated with musical sound waves (329.6 Hz) on Earth points of major yin meridians when those points were clinically indicated as determined by Worsley-trained acupuncture practitioners. The musical sound wave was generated with a tuning fork, and each patient was tested and re-tested for matched-pair analysis of data. Three response categories—better, no change and worse—were compared with attention given to quantitative and qualitative differences as a function of age, CF, point, point function, meridian and the



season in which treatments were received. Significant ( $p = .05$ ) results indicate that treatment responses to the sound waves were not individually-specific. Significant results also indicated that therapeutic responses were more reliably accomplished on tonification points ( $IV_3$ ,  $IX_9$ ) and on  $XII_3$  than they were on those points that are sedation points ( $I_7$ ,  $V_7$ ,  $VIII_3$ ). Trends in the results suggest that effectiveness of this pitch may be meridian-specific and point-specific. Trends in the data suggest that therapeutic responsivity was CF-specific with people having Water CFs showing more therapeutic response to treatment than people with other CFs. Trends suggest therapeutic response was possibly seasonally-specific with Late Summer therapeutic responses somewhat greater than those from treatments received in other seasons. Trends in the data also suggest that instrumental preferences may be used to diagnose principal energetic imbalance. Conclusions from the data are generalizable to include music of E major and E minor, but restricted to meridian energy interactions with 329.6 Hz. Findings relative to the musical sound equivalents of the Five Functional Voices in the Systems of Correspondence, the theoretical foundations of ancient Taoist medical theory, are promising. Trends in the data support the hypothesis that overtone frequency (E) 329.6 Hz is the contemporary equivalent to Kong if the fundamental is  $C_2$ .

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# CHAPTER I

## INTRODUCTION

### Overview

All human beings are susceptible to stress disorders regardless of individual or cultural differences, age, environmental factors, diet or lifestyle. The severity, duration and specific symptoms depend upon many factors. Some factors are external to the individual, some are within the individual. While psychogenic stress will probably never cease, individuals can learn to modify physical, emotional and intellectual responses to those stressors. In doing so, individuals can modify the nature, extent and duration of stressors in the interpersonal, intrapsychic or environmental systems to which they must adapt. Across time and cultures many methods and materials have been tried to assist people in the re-learning process. The practice and refinement of many disciplines from different regions of the world has resulted in considerable exchange of ideas, ways of conceptualizing the disease process, the healing process, treatment goals and evaluation of treatment outcome. Another result of this dialogue has been an ever-increasing re-examination of multicultural methods of treatment which have stood the test of time, if not the ease of explanation. Another result of this cross-cultural and time exchange has been an ever-increasing appreciation of the complex interconnectedness of mind/body/environment.

Over a number of years, I have developed an integrated systems model for using music in therapy for people with psychogenic stress disorders. This model draws on bodies of knowledge from music, stress theory, contemporary



psychotherapies and Taoist medical theory. This investigative and applied research pilot study was conducted in order to further the development of that model and to further inform research efforts in this field.

### Theoretical Background

Music is one of the many tools humans have used to modify response to stressors. Music therapy--the intentional use of music for therapeutic gain--is one of the many therapeutic modalities most contemporary and ancient cultures have created. Universally, music has been an integral part of sensory, emotional, intellectual and spiritual life. In both the East and the West, music therapy probably began in prehistoric times. Ancient and primary texts such as the Old Testament of the Holy Bible, the Nei Ching (the ancient text of Taoist internal medicine, *circa* 300 B.C.) and the Upanishad (the ancient text of the Sidha Yoga tradition) document the intentional use of music and sound for therapy, *per se*. Historians and musicologists document music therapy as both a universal and an ancient healing art. Currently, music is used in a wide variety of outpatient treatment, hospital, rehabilitative, educational and spiritual growth institutions or settings. Modification of physical or psychological stress symptoms are often included as explicit treatment goals for the prevention of complications from medical procedures, for reduction of anxiety or fear, for pain management or to assist in various contemporary psychotherapies.

In psychotherapy, verbal and paraverbal counseling interventions are often all that are needed to effect therapeutic change. Music, without verbal

intervention, is often enough to effect therapeutic change. In combination with verbal and paraverbal intervention, music intervention can provide a very effective "co-therapist" to support or accelerate the therapeutic process. Sometimes, however, verbal interventions, musical interventions or the combination of both do not successfully catalyze the healing response as quickly as a client's characteristic response to stressors encroaches on an already compromised individual. Sometimes musical interventions have what appear to be counter-therapeutic effects. Instead of obviously assisting the individual in reorganizing a functional response to psychogenic stressors, the musical intervention seems to exacerbate the characteristic response.

At the current time, music interventions are not therapeutically reliable for the treatment of psychogenic stress disorders. Research in the field of music therapy has been hampered by the difficulty of isolating musical elements for clinical testing without losing the whole of a musical experience. A more primary reason is that there is no comprehensive or integrated model for framing pathogenesis, for measuring therapeutic response or for interpreting the meaning of symptomatic change during a healing process. There are few common operational definitions or outcome measurements which account for individual differences from pre-intervention baselines and consequent differences in response to musical interventions. Research findings do show, however, that music does effect a wide range of human behaviors, emotions, cognition, and some physical or psychological indicators of stress disorders.

Traditional Chinese medicine is another therapeutic system used in both the East and the West to modify dysfunctional psychophysiological responses to

stressors. Acupuncture, practiced continuously for at least 3,000 years, is the most widely practiced branch of Oriental medicine with which some Westerners are most familiar. However, it is only one of several branches which include music therapy, nutritional therapy, and medical herbistry as well as movement and manipulation therapies. Psychotherapy is understood to occur as an integral part of functional changes as a result of treatment. Underlying the application of all treatment modalities, techniques and materials is a highly sophisticated systems theory of human process, disease process and the healing process. Theory and practice include recognition of the same internal and external factors Westerners currently recognize as stressors. The theoretical frame is far more comprehensive but congruent with stress theory, the General Adaptation Syndrome, so clearly articulated by Hans Selye. Taoist medical theory provides an adequately broad cognitive frame in which to organize the plethora of emotional, physical and cognitive functions, stress disorder symptoms, individual differences and progression along the healing continuum.

In my practice of music psychotherapy it has been obvious to me that sometimes musical intervention has interacted with meridian energy. When it has, clients report sensation and feeling states comparable to those reported by people in acupuncture therapy. On those occasions when musical interventions have interacted directly with the meridian energy system, the psychotherapeutic process was catapulted forward without difficulty for the client. There was rapid resolution of symptoms. Whereas conventional verbal and paraverbal therapy interventions can be slow and can reach intractable plateaus, introducing properly



selected music to reliably effect energy patterns can be critically valuable and important to the treatment.

It has also been apparent in my practice of music psychotherapy that direct interaction with specific energy meridians is sometimes necessary as the precursor therapeutic event since, without energetic change, many maladaptive behaviors are extremely resistant to treatment. Without energetic change, the individual may have to resort to chemical or surgical options, sensory aids, or compensatory behaviors. Direct energetic interaction with specific energy meridians is sometimes necessary as the precursor event (a) in order to set the psychophysiological reorganization process into motion for psychotherapeutic intervention, (b) to prevent behavioral encroachment on the underlying energy system which would result in deepening of maladaptive responses, or (c) to expand the range of adaptive responses available to a client or psychophysiological system.

Music is both complex and simple. In its complexity, it is an evolving, perceptual whole with sensory, cognitive, emotional and spiritual intent in its organization and in its reception. In its simplicity, it is energy--energy with quantifiable and predictable wave patterns which in clinical practice seem to interact with the wave patterns of meridian energy. If the patterns of interaction could be discerned, then musical interventions which do have direct energetic interaction could be designed with therapeutic reliability.

## Statement of the Problem

Because music does appear to interact directly with meridian energy, and because that interaction can be such a valuable psychotherapeutic aid, it becomes important to predict the nature of the interaction. In order to be effective and responsible, direct interaction with meridian energy must be done in accord with Taoist medical theory and practice principles. The ancient medical music therapy literature does discuss pitch and keys (modes) and recognizes them as central to meridian energy interaction. The ancient prescriptive writings are very specific as to anticipated interactional effects of specific musical sounds (pitches) with specific meridians. Descriptions in the ancient writings of the interactional effects of properly-chosen pitches with meridian energy make it clear that the effects would be observably comparable to those expected from proper acupuncture therapy needling. Unfortunately, the meaning of the ancient musical language describing those specifics has been lost to contemporary theorists and practitioners. At this time the frequency of each of those pitches is unknown. None of the music therapy prescriptions have been practiced or clinically tested in contemporary times. The contemporary literature offers no explicit guidance about music/energy meridian interaction. In contemporary music therapy research, no attention has been given to pitch or key, even though pitch and key are central elements in a musical event.

Neither current Eastern nor Western resources and approaches to understanding the effects of music on human stress responses or other behavior are sufficient by themselves for predicting the interaction of musical events with

meridian energy. At the current time, there is little or no knowledge of the effects of musical sound in general, the effects of specific musical elements or the effects of pitch or key on meridian energy.

### Purpose of the Study

The purpose of the study includes four major objectives. The first is to clinically test the interaction of the first of five musical pitches with meridian energy. The second objective is to uncover any patterns in that interaction which would verify the pitch selected to be effective in promoting therapeutic response to musical sound congruent with ancient Taoist treatment principles and prescriptions regarding the use of musical sound in therapy. The third objective is to draw inference from the findings which could be applied to the design of more therapeutically reliable musical interventions in the context of music psychotherapy for the treatment of psychogenic stress disorders. The fourth objective is to provide information needed to inform modifications of the study design for further research in the field and in testing the other four pitches.

### Method

Acupuncture points will be stimulated with musical sound. The musical pitch for the experimental treatment will be generated by a tuning fork calibrated to vibrate at 329.6 Hz (E). Licensed Worsley-trained acupuncturists will administer the experimental treatment sessions to participating subjects. The subjects will be volunteers from among the participating acupuncturists' regular



patients. The experimental treatment will be administered in a standardized way. During the period of data collection, any time one of the researcher's selected points is therapeutically indicated for any of the subjects, the acupuncturist will stimulate the selected point and record the treatment response. This procedure will be used to create a test trial and repeated when therapeutically indicated to create a retest trial. Each subject will receive only two treatments, each treatment on the same point. The period of data collection will be over when there are 20 matched-pair treatments on each of the points selected to be used in the study. For each subject, age, sex, diagnosis, point selected for treatment, date, musical preferences, and any significant comments from each subject or the acupuncturist will be recorded by the acupuncturist.

### Significance of the Study

If it is demonstrated that the pitch tested promotes therapeutic response through interaction with meridian energy, the study will make several contributions. The first is in adding to the body of knowledge relative to the treatment effects of one element of music—pitch—and the related elements, key and timbre. Knowledge of these effects is essential to the development of therapeutically reliable music interventions. Such findings would have valuable implications for the use of music in treatment of psychogenic stress disorders, for other music therapy applications, for psychotherapists, for educators, and in self-help programs designed for prevention of stress disorders. In addition, findings from this study could have immediate application in current acupuncture therapy.



Findings from the study will contribute to the development of an integrated systems model for the treatment of psychogenic stress disorder.

If it is demonstrated that the research method used for the study is satisfactory, the pilot study will contribute both a method and data necessary for continuation of research in this field. If empirically demonstrated findings from this study are encouraging, the study will contribute contemporary knowledge of pitch equivalents, key and timbre to the Systems of Correspondence, the theoretical foundation of Chinese medicine. Findings from the study have the potential to make a contribution to the revitalization of the music therapy aspect of this ancient body of medical arts for use in contemporary clinical work.

## CHAPTER II

### THEORETICAL BACKGROUND

#### Introduction

This chapter provides a fuller view of the conceptual background from which the overall purpose of the study emerged. This background is necessary for understanding how the general focus of the study—the interaction of musical sound waves and meridian energy—contributes to continuing the development of a comprehensive integrated systems model for music psychotherapy in the treatment of psychogenic stress disorders. This chapter also provides definitions of terms and the necessary theoretical background for understanding how the specific focus of the study—the interaction of one element of music, pitch, with meridian energy—contributes to the expansion of knowledge relative to the treatment effects of music, contributes to the theoretical foundations of ancient Chinese medical arts and to future research from the pilot study.

The development of an integrated systems model provides a sufficiently comprehensive frame for me to solve some of the methodological difficulties in music therapy research and some of the clinical issues encountered in the practice of music psychotherapy. In comparison to current models, an integrated systems model is holistic, offers a more inclusive definition of stress, incorporates multi-cultural perspectives of etiology relative to stress disorders, applies a broader definition of effective or *desirable* treatment outcome, and provides a rationale for interpreting symptom progression during therapy. Expansion of the body of knowledge relative to treatment effects of each element of music is essential to

development of predictability of intentionally designed intervention effects. Both a comprehensive theory and intentional techniques congruent with the theory are requisites for generating a treatment process which reintegrates the arts into clinical practice with therapeutic reliability.

Understanding of both the integrated systems model and that which is currently known about music treatment effects relative to the study are essential in understanding the rationale for development of the research hypotheses, experimental procedure, data chosen for collection, findings, conclusions, and especially to understanding clinical applications. To that end, the chapter provides a brief and necessarily oversimplified synopsis of each of the major complementary process theories and systems which have contributed to my clinical work, to the development of the model, and to the focus of my research objectives. These theoretical frames include stress and adaptation as articulated by Hans Selye, holistic therapeutic process theory, and Taoist medical theory and practice principles. Also included are discussions of both the contributions and the limits of contemporary music therapy research findings relevant to treatment effects and to the interaction of music and meridian energy. Ancient Taoist perspectives on music in the systems of correspondence are reviewed as a frame for the development of the study hypotheses. The focus in presentation is on the similarities inherent in each system and body of knowledge rather than on the dissimilarities. Where necessary, I have articulated the inductive links.

Both Eastern and Western—ancient and contemporary—medical arts researchers and clinicians have sought to develop treatment for physical and mental illness. The Western conceptualization of stress disorders and techniques



development for non-invasive treatment alternatives to suppression or masking of stress disorder symptoms are comparatively young. Traditional Oriental medicine, on the other hand, has effectively been practicing from a comprehensive theoretical frame for thousands of years. Language is a map to the psyche. The language of Oriental medicine grew in an ancient agrarian culture where observation of all phenomena were closely tied to the rhythms and patterns of the natural environment. The differences between the ancient Eastern medical arts and scientific investigation and contemporary Western medical arts and scientific investigation are, however, more than a difference in vocabulary.

There are significant dissimilarities in the way early investigators in each culture defined the problems, related them to what was already known, conceptualized new theories, and evaluated solutions. Western culture, and Western medical science in particular, looks first for causal connections and inductive links last. In contrast, Eastern science is based on inductive, synthetic and correlative modes of cognition. Western culture defines, creates, and evaluates today's theories and techniques as obsolete or foolish and discards them tomorrow. The ancient Eastern cultural approach in the healing arts and sciences was to observe today, describe tomorrow, and build on those the next day.

The developmental history of the musical arts, the logic of music cognition and the performance of music is more analogous to the developmental history of Taoist medical theory and practice than to the developmental history of Western theories and practices. Western culture's arrogant resistance to appreciating these differences is waning, is reflected in the development of contemporary psychotherapies, and is spurred on by clients seeking more effective treatments.



Psychotherapy—for both practitioner and client—requires both modes of investigation; music processing requires both modes of cognitive functioning and the use of music in therapy has crossed both modes of function and cultures continuously throughout history. As a psychotherapist educated from one cultural perspective, reared in the agrarian segment of the 20th century, treated for stress disorders from both perspectives, I am able to relate to either. As a musician, however, I cannot refrain from integrating the various strains in the development of my work.

### Overview of Background

Psychogenic stress disorders display a wide range of physical, emotional and cognitive symptoms. In a healing process--as opposed to symptom suppression--one expects to see progressive changes in physical, emotional and cognitive measures of function. Newer levels and complexities of malfunction resolve first; the oldest last; more vital functions first; less vital last (Weiner & Goss, 1982). Unless a careful case history is taken, temporary symptom reappearance can be mistaken for symptom substitution or a failure of the therapeutic intervention.

The function of holistic therapeutic intervention for the treatment of psychogenic stress disorders is to (a) identify the dynamic state within which intervention must occur, (b) provide intervention that is logical at that given time for a client, and (c) provide the least-necessary intervention which enables the disordered psychophysiological processes to restore self-regulation for the next

step in the reversal of disease progression. Taoist medical theory, as a general systems theory of passages, provides a structure for organizing the constellations of psychophysiological events and universal themes around which individuals orbit in the healing process and in the process of enacting functional adaptation to stressors. When applied to the use of treatment modalities, the theory generates practices which provide individually-specific diagnoses and interventions designed to improve the health of meridian energy and associated psychophysiological functions.

Both ancient Taoist medical music therapy writings and contemporary music therapy research suggest that music is capable of providing therapeutic intervention for stress disorders. Contemporary research efforts have focused on specific physical or psychological outcome measures from treatment with a broad range of musical interventions. Ancient Eastern research focused more on identifying the specific musical pitch (key) interventions which resulted in meridian energy change and were congruent with the general systems theory of human process. The Taoist systems of correspondence included those interventions. By combining knowledge from both worlds, we may better understand how it is that music continues across time and place.

### Stress and Adaptation

Stress, stress reduction, stress symptoms, etc. have taken on almost colloquial meanings usually referring only to the state of arousal associated with the term "fight or flight." In an integrated systems model *stress* is conceptualized

according to the work of Hans Seyle who defined stress as the non-specific response of the body/mind to any demand. When stress is observed, it is observed as both the specific action of a particular agent and the non-specific response. Systemic stress is the whole response rather than the response of one organ system. Selective changes in any one system, when produced by anything as long as it is applied to that system, are manifestations of local stress. Those changes produced throughout the body by any number of agents, no matter where they are applied, are the manifestations of the general adaptation syndrome (Seyle, 1984). By agent, Seyle means to convey the idea of anything, either internal or external, material or non-material which contacts *psyche* or *soma* in some way.

Stress disorders are defined as those disorders Seyle labels as "diseases of adaptation." These diseases are characterized by the defensive reactions of the body/mind dominating the symptom complex. These include the traditionally-defined psychosomatic disorders such as anxiety, ulcer or asthma. In addition, they include a variety of chronic and degenerative disorders affecting various organ systems, a range of mental health disorders and some learning, developmental or communication disorders. Symptoms may include immunological or other functional disorders such as gastrointestinal, genitourinary, cardiopulmonary or musculoskeletal disorders. Symptoms may also include pain syndromes with or without tissue damage, psychosocial adjustment difficulties, many forms of personality or neurotic disorders, depression and eating or substance abuse disorders (Arntz, Dressen, Merchelbach, 1991; Coren, 1992; Hoehn-Saric, 1989; Ley, 1991; Seem, 1987; T. Smith, 1983; Klein, Rabkin, et al., 1981; Reid, 1983; Lowen, 1972; and F. Smith, 1990).



Psychogenic stress disorders are defined as those that are directly "caused" by the mind, those in which the mind is affected and those that are most amenable to self-healing by the mind. These include those disorders in which psychological stressors are, or were, the primary stressors. These disorders include a wide range of symptoms which clearly demonstrate the functional link between body and mind. In this model, all diseases could be considered "psychosomatic" in the sense that all disease has mental and physical components. Psychogenic stress disorders may manifest symptoms at the physical, emotional, intellectual or spiritual levels. Those acute or chronic disorders that are primarily the result of unusual physical, chemical, radiation or surgical trauma are not included in the definition of psychogenic stress disorders. While these traumas would initiate systemic stress, only secondary responses would fit the definition of "psychogenic."

At the physical level, the fully-developed general stress syndrome is characterized by three stages. The first, the alarm stage, is referred to as the "fight/flight response." In this stage, sympathetic nervous and hormonal signals mobilize energy for response to perceived threat. Heart rate, breathing, oxygen consumption and perspiration increase; pupils dilate; adrenalins, corticoids and glucose flood the bloodstream. In the second stage--resistance--signs of the alarm reactions are diminished or nonexistent but adaptations may include the development of acute or chronic functional disorders. The third stage, the stage of exhaustion, is one in which tissue or organ damage occurs (Weil, 1983). Some practitioners of stress therapies (Gillespie & Bechtel, 1986) have added a fourth



term to describe the stage at which the organism no longer has the capacity for recovery--this is called termination, and death is imminent at this stage.

Stress is present at any moment during each of the stages, but the biological, psychological and spiritual properties are different as stress progresses. Regardless of the stressor--physical, emotional or intellectual--all the stages may be present over time. Resistance and adaptation depend upon the proper balance of a number of variables: (a) the direct action of a specific stressor on the being; (b) the internal response which stimulates defense; (c) the internal responses which enable peaceful coexistence with the stressor; (d) inhibition of unnecessary or excessive defense; and (e) the presence or absence of additional but secondary stressors.

Alarm signals from stressed tissue or mind are sent to the hypothalamus, the thalamus and the endocrine glands--particularly the pituitary and the adrenals. Emergency and adaptive hormones, both pro- and anti-inflammatory, are produced to mobilize appropriate interpretation and activity/inactivity so as to prevent "wear and tear" on the body. Other hormones can be mobilized to induce toxin-metabolizing enzymes by the liver. Digestive processes, lymphatic structures and white blood cell production are affected. The nervous, endocrine and lymphatic systems play particularly important roles in maintaining resistance and in returning the organism to homeostasis after cessation of exposure to the stressor. Sympathetic activity generally promotes response to the stressor and parasympathetic activity modifies the response so as to assist balance and harmony of response throughout the body/mind.

Successful adaptation includes a number of concepts, including the following: (a) confining response to the smallest area of action necessary; (b) directed growth of reaction; (c) selected responsiveness to stressors; and (d) developmental adaptation mobilized by previous response and transadaptation, i.e., response to demands by mobilization of dormant response possibilities with regression of previously more prominent ones. Seyle defines diseases of adaptation as maladies brought on by imperfections in the general adaptation syndrome. Rather than accomplishing successful and successive steps in response to stressors, the responses are overreactive, underreactive or the result of excessive demand for adaptation. When applied to a body/mind/spirit system, stress interferes with our ability to resist organic diseases, our ability for appropriate emotional and cognitive flexibility and our capacity for individually-specific growth and development.

### Holistic Therapeutic Process Theory

Health needs only non-interference. Disease necessitates treatment which is directed to the level of malfunction most useful in re-establishing therapeutic communication across levels of function. When the therapeutic process goes well and change occurs, it is the result of some or all of the following: (a) pattern recognition; (b) expansion of some patterns; (c) concentration of other patterns; or (d) fracturing of patterns into discreet parts for greater understanding and/or re-establishment of homeostatic controls. These changes enable the process of successful adaptation to stressors as articulated by Seyle. Change begins where

the individual last experienced dysfunction. With either mind or body as "agent," the relationship between agent and "self" is changed.

It is this modification in relationship that provides the foundation for further development. Holistic therapeutic process theory accepts the view that the brain functions holographically (analogically) and analytically (digitally). Auditory, sensory, motor and visual systems of the brain process input from the senses in the frequency domain. These become encoded into distributed memory traces (Pribram, 1978). Perception—the meaning of sensation and emotion—is encoded in a similar fashion. Other states of consciousness—cognition and intuition—involve both information-processing systems, one in the dominant hemisphere (cognition), and the other in the non-dominant hemisphere (intuition). Cognition is thought to be primarily linear, sequential and digital; intuition is theorized as holistic, transformational and analogical (Battista, 1978). Holographic mechanisms are assumed to be involved in self-awareness, other awareness, intuition and pure awareness. These are sometimes experienced as transpersonal states of awareness which seem to unify analytical and holographical processes.

Bentov (1977) and Anderson (1977) postulate that the operant condition involved in healing states may be the process of decoding the full spectrum of information about the universe that has already been encoded holographically. In decoding information during states of awareness like meditation, deep relaxation, total engagement with music, and perhaps dreams, new, more or qualitatively different information is available for reorganization at higher levels of function (more integrated). Holographic and analytical methods of processing information



generate different states of awareness, different sensory experiences, different cognitive frames, different brainwave activity and modified electromagnetic fields.

The analytic and holographic aspects of brain function are complementary modes of function used for remembering, receiving, knowing and sending information throughout the organism. Stress disorders, from this perspective, may represent a breakdown in the capacity of the organism to utilize both modes of functioning in the encounter with physiological and environmental stressors, as well as with internal messages. Regardless of methods used to promote healing, when healing occurs, therapists and clients describe stages in the healing process. At any given time there is awareness of a constellation of sensations, changing perceptions, emotions, behaviors, memories, insights, cognitive constructs and psychological defense mechanisms.

Collectively, these constellations oscillate or orbit around central themes that are part of unintegrated personal history. In time, the themes may move to more universal or collective levels, to cultural archetypes or to social issues that revolve around central themes that are interactional and interdependent. The details of the content are infinite, although the general themes are finite. Even when an individual is not aware of patterning around central themes, the therapist can witness an unfolding of client issues around those themes.

Across therapeutic traditions, some commonalities occur. Individuals are able to cross beyond concerns of personality and ego-integration into areas of the transpersonal. Commonly-felt experiences across traditions may include any of the following: (a) periods of reliving or reevaluating one's unintegrated personal history; (b) the appearance of spontaneous imagery; (c) physiological changes; (d)



unusual sensations; and (e) high levels of insight that facilitate integration of ego and receptivity to unitive consciousness. Some describe the quality of experience as being grasped by and subject to some power beyond oneself (Proudfoot, 1985), *a felt connection that goes beyond insight*. These experiences often lead to greater ego-integration and to physiological healing (Tart, 1975). Which of these experiences occur, which themes emerge or on which level of function healing occurs depends upon where an individual is developmentally and in the healing process itself at any given time. Qualitatively similar descriptions of experiences are sometimes described by people relative to the experience of music—from listening, composing and from performing.

Holistic therapeutic process theory also accepts the view that there is a two-way, multilayered and self-regulating electrical system throughout the body. It is composed of both alternating currents (AC or nerve impulses) and direct currents (DC or perineural cells). DC currents seem to be involved with encoding and conveying information by their fluctuations as they flow *into* the central nervous system. Since these currents are coupled with biomagnetic fields, they are affected by external fields. Effects show as perturbations in the current. Becker & Selden (1985, p. 241) suggest that every phase of mental activity as well as the integrative and healing functions of the body are directly involved with the DC system. Becker's research demonstrates that intentional modulation in these currents from chosen sites in the electromagnetic field can activate both physical and psychological healing states. This is probably the most comprehensive understanding of how acupuncture therapy works with points on the meridians acting as amplifiers, or DC generators, along the meridians (Becker & Selden,

pp. 229-42). Functionally, these sites and the meridian energy are the interface between mind and body. Becker has not mapped these sites or their specific functions. However, Oriental medicine has, and has been successfully using the maps as guides to treatment of health disorders for over 3,000 years.

### Overview of Taoist Internal Medical Theory and Practice Principles

Taoist internal medical theory and the Chinese analytical system of Twelve Officials and Five Element Theory are very useful tools for understanding and treating the mind/body/spirit, both at the level of psychophysiological processes and at the level of the organizing principles which structure and unify the adaptive functionality of processes within the body/mind. This general theory of passages is useful for analyzing and predicting changes during functional or dysfunctional adaptation to stressors. The Five Element Theory (Five Evolution Phase Theory [Porkert, 1974]) also very adequately describes and encapsulates universal constellations of processes, which, by exaggeration, are more clearly evident in pathological states or during a healing process. The Twelve Officials adequately describe and encapsulate the directing, inhibiting, balancing functions and thematic material more clearly evident also in pathological states or during a healing process which help differentiate one constellation of process from another.

From a Taoist perspective, the "body" encompasses a number of different meanings: (a) the corporeal form that can be seen, touched and clad; (b) the organizing principles which structure and unify the body and permit coordination of function and conduct of life; (c) the ensemble of forces which act within the

human being and encompass feelings, mores and situations; and (d) that which takes "earthly" form in response to "heavenly initiative" (Larre, 1986). In these concepts of "body," mind/body are one; body is not separate either from the mind or from the universe which interacts with a person throughout the lifespan (mind/body/environment).

The unifying concept which underlies all observations, diagnoses and treatments is the concept of the Tao. One yin and one yang are the Tao. Yin transforms to yang, and yang transforms to yin, so that there is a constant, dynamic tension. Yin and yang are the most universal terms which encompass all polar opposites and their transactions. Yin/yang is the energy for all movement in an endless spiral of transformations. Yin and yang are not directly translatable. The meanings of the words have come from examination of the earliest use of the words in various contexts. The most basic of definitions is that yin is structive; yang is active. Several other contextually derived descriptors are included for each. Yin denotes something completing; something reposing, quiescent, static; something sustaining; something awaiting organization; something murky; dark, inside, female, moist, winter, sinking, descending. Yang denotes something giving rise to, setting loose; something moving; something developing, expanding; something determining; brightness, heat, male, day, dryness, summer, ascending, outside (Porkert, 1974, pp. 13-26). This transformational process may be conceptualized at the level of protons and electrons, at the organ system level or between body (matter) and consciousness (not matter).

Any event may be described as displaying either more yin or more yang tendencies. In a healthy state, individuals fluctuate in characteristics around this



balanced state. When there is a decline in yin tendencies, there is an increase in yang tendencies, and *vice versa*. All yin-yang transformations have been described in Oriental medicine as forming five distinct phases of transformations (Five Elements), each with an extensive System of Correspondences and associations including, for example, psychophysiological processes, biorhythmic *times* (seasonal and daily), nutritional needs, specific emotions, musical keys, overtones, colors, sense organs, cognitive skills, spontaneous imagery and other system functions. Each phase is more yin or more yang in relation to each of the others (see Appendix, Figure 1). Each phase is a dynamic process and each phase is in dynamic relationship with the other phases. If either one or the other tendency predominates, a dynamic and complementary system no longer exists. The system tends toward dissolution of functional adaptation and towards the development of pathological symptoms. These phases as applied to stress disorders can assist in organizing the array and progression of symptoms, and the dynamic interaction which underlies the general adaptation syndrome. The yin-yang transformations within and between phases include (yin) sympathetic/parasympathetic (yang) activity (see Appendix, Figure 2).

Pathological energy is any disturbance in the play of the normal energies of yin/yang transformations. Both external conditions (agents) and internal conditions (agents) can disrupt the yin/yang transformations. External conditions which can disrupt the normal quality and direction of energetic movement and homeostatic regulation include normal atmospheric or climatic conditions such as heat, cold, dryness and humidity which are excessive (stressor) for any individual (Nei Ching), or, for any individual, climatic conditions different from those for



which genetic adaptations have been made. Also included here are climatic conditions different from those normally expected; i.e., a cold summer, a dry spring, or unusual events such as floods, hurricanes, etc.

Internal conditions (agents) which can disrupt the normal circulation of energy and homeostatic regulation are the following: disruption of respiratory and eliminatory functions; nutritional excesses or deficiencies; excessive or deficient liquid intake; sexual excesses; *receptivity* to pathogens; and excesses or deficiencies in the experience of, in the expression of, or in the repression of emotions (Nei Ching). Each emotion shown in Figure 2 is, in Taoist medical science, the specific emotion associated with each phase which can be harmful to or supportive of the respective phase of transformation. Each emotion is also the one which shows as "inappropriate" affect if the energy circulating in that phase is pathological. Just as any of the other internal conditions (stressors) can be the cause and/or effect of pathology in the energy, an emotion experienced in excess or insufficiently can be the cause *as well as the effect* of disturbed function in the normal circulation of energy of yin-yang transformations. Similarly, pathological food or substance cravings, behavioral extremes, immune function disturbance etc. can be the cause as well as the effect of disturbed yin/yang transformations in one or more phases. Symptoms may be temporary or chronic heroic efforts to mobilize balance in yin/yang transformations within or between phases. Normal variation in food preferences, behavioral patterns and changes, the occasional common cold, etc., are examples of successful adaptive responses (see Chapter 2, p. 17) as conceptualized by Seyle, and necessary to maintain, assist, propel, normal healthy yin/yang transformations.

Energy is the intersection of external and internal. Disturbance in energy from either any internal conditions (stressors) or any external conditions (stressors) can result in disturbance and vulnerability to additional disturbance from the other. A good example is seasonal affective disorder. If unchecked through self-regulation, the pathological energy does not stay isolated to one phase of function or level (physical-psychological) of function within the phase(s) affected. Implied in this description of stressors is reasonable expectation that all but the extremes (or cumulative) are subject to self-regulation. Failure to successfully modulate yin/yang transformations (known through symptoms) under conditions that are not extreme is indicative of pathological energy within the individual that (a) needs assistance, and/or (b) change in lifestyle.

The classical text of Taoist medical theory and practice emphasizes the laws of balance and harmony in life and in medical treatment. If the laws of balance and harmony are not followed in treatment through mere symptomatic management or suppression, disease is driven deeper and will express itself at a deeper and more serious level. The systematic and predictable dynamics of such a progression are the product of yin/yang transformations, the smooth transmutation from one energy phase to another and healthy transactions between the phases. For practical purposes in further understanding transformations of yin/yang energy and its expression in physical or psychological behavior, some finer distinctions are necessary.

Smooth transmutation from one phase to another, healthy relationship within a phase, and healthy relationship among the phases are accomplished through the healthy movement of the life force in the meridian pathways. The

meridian pathways *function* as energy conduits. There is no evidence of any tissue structures analogous in organization to, for example, nerve tissue or the circulatory system. Theories offered as explanation of a physical cause of their function include messenger-type biochemicals or structures such as perineural cells (see Chapter 2, page 21). Diagrams showing anatomical locations show functional pathways not anatomical structures. Taoist medical theory postulates twelve major meridian pathways and some secondary pathways around which structures of the human body are formed. Six of these major meridians are yin meridians and six of them are yang meridians. These meridians carry the energy necessary to animate all life functions in the individual. The life functions and integrity of the structures is the result of the energy (life force) in each pathway and the communication among the pathways. The energy in these pathways passes through the whole body with daily and seasonal biorhythms and with the capacity for both healthy and pathological patterns (Nei Ching). This life force, Ch'i, is present before birth but does not begin to circulate independent of the mother until after birth. Ch'i is considered to be more than the sum total of each of the following: (a) the energy derived from the union of the original parental yin and yang; (b) the intellectual, affective and spiritual disposition presiding over the individual at the moment of conception (Porkert, 1975); (c) genetic material inherited from the parents (Rapports, in Larre, 1986); (d) energy derived from digestive and respiratory processes; (e) other cosmic material or energy (e.g., light waves, sound waves, x-rays, etc.); (f) information and experience; (g) degree of congruence between internal and external events (Larre, 1986).



All Ch'i energy carried in the meridians functionally transforms from one phase to the next in a well-defined way. A clockwise tracing of the schematic representative of the five phases is called the generative, creative, or Shen cycle (see Appendix, Figure 1). This cycle describes the healthy mechanism for generation of characteristics or processes associated with each subsequent phase. A clockwise tracing of the five phases, in which every other phase is skipped, is called the control cycle, or the K'o cycle (see Appendix, Figure 1). This cycle describes the healthy mechanism for checking excessive generation of characteristics or processes associated with every other phase.

In a pathological state, the sequence of the energetic movement cycle is called the violation cycle. Effectively, this is the K'o cycle in reverse. In this sequence, the checking mechanism degenerates so that phases, rather than being checked, are violated. Illness is indicative of one or more phases being excessively weakened or *strengthened* so that normal homeostatic mechanisms for maintaining balance are impaired (Klate, 1980). Stages of transformation become degenerative rather than generative. Physical, emotional and/or cognitive processes become impaired and consciousness development cannot progress. Therapeutic interventions are ones which bring various aspects of each phase into internal congruence so that the physical and psychological aspects of each phase have enough integrity to provide a foundation for transmutation to the next phase (Shen cycle) and/or to diminish excessive checking (K'o cycle).

The rich, metaphorical names for each of the five phases of transformation are as follows: Water, Wood, Fire, Earth and Metal. These names for each of the five phases in English were given to them by early missionaries from Europe



to China. Each of these spheres of function are divided into a yin and a yang aspect with the exception of the Fire phase which is divided into four parts, two yin and two yang. This division generates twelve distinct functional units which correspond to the specific functions of each of the major meridian pathways. Each of the twelve meridians—six yin and six yang—is responsible for energizing specific arousing, adaptive, and balancing (yin/yang transformations) response possibilities to stressors to assure health and manifestation of an individual's unique potentials in the world. These twelve divisions—Twelve Officials—were given their names from anatomical structures through which they pass. The "officials" are not the structures. The names serve only as useful terms to describe energetic fields of functional activity. Roman numerals have been added to the names in the (spatial and temporal) order in which energy moves through the body, and to indicate how the meridian functions connect to each other. They are Heart (I), Small Intestine (II), Kidney (III), Bladder (IV), Pericardium (V), 3-Heater (VI), Gall Bladder (VII), Liver (VIII), Lungs (IX), Colon (X), Stomach (XI), and Spleen/Pancreas (XII). (See Appendix, Figure 3.)

Centuries ago, Taoist physicians had already mapped the meridian pathways, knew where the meridians conjuncted and which organs each meridian innervated. They had located hundreds of sensitive points originating from the meridians on the surface of the body. These foramina are sensitive points on the skin with different electrical potentials from the surrounding skin. The clearest empirical constituents of the meridian system are the points. The points *feel* different and under certain conditions, can be seen (anecdotal). Points are located

on the meridians where the meridian pathway runs near the surface, and each of the twelve major meridians conjunct on the surface of the body. Acupuncture needling is often done at the points where meridians conjunct in order to assist energy movement between the two conjuncting meridians.

Points had known therapeutic value and could be used symptomatically—for example, to reduce high blood pressure, cause large muscle relaxation, increase or decrease breathing rates, increase digital temperature, change the level of perspiration, increase or decrease appetite, decrease water retention, lift depression, assist the transformation of anger to creative behavior, regulate blood sugar or treat infertility. Points could alternatively be used for systemic treatment.

Various schools of thought arose on how to juggle symptomatic versus systemic treatment. Underlying all schools of thought are the principles of balancing the functional relationships in the biomagnetic energy within and among the meridian pathways. Tonification of deficient energy and sedation of excessive energy are the two primary terms used to describe a variety of therapeutic goals which guide techniques of point selection and contact.

The primary goal of diagnosis is to identify which phase and/or which official (one of the twelve pathways) is the key to dysfunction; i.e., ascertaining where and when the functional adaptive response went off track. In clinical practice, the identification of this dysfunction is often called the principal energetic imbalance, sometimes identified as the causative factor (CF). Treatment is often only on the meridian identified as the causative factor. Treatment includes modulating the energy flow by contacting the biomagnetic fields at specific point sites along the meridian pathways. Balancing the functional

relationships within and among the meridians includes but is not limited to sedating excessive energy, tonifying deficient energy, transferring energy and soothing energy within or between the pathways. Modulation of energy is made in the direction indicated by the arrows in Figure 1 that shows the creative and control (Shen and K'o) cycles.

Treatment in a systemic approach is confined to the least action necessary to help direct the growth of reaction. Treatment addresses only the level needed so that the individual's repertoire of responses can coordinate the multitude of fine-tuning necessary for healing. Underreactive or overreactive responses are temporarily modulated by treatment. That window, available with energy and all associated processes temporarily redirected, affords the individual (a) an *experience* of balanced yin/yang transformations, (b) an insightful view of healthy function, (c) temporary congruence between internal and external events, (d) qualitatively different, quantitatively sufficient Ch'i in each meridian with which to process information and experience, and (e) with which to mobilize dormant response possibilities. All the requisite variables are at least temporarily available for an individual to re-learn self-modulation. Patients generally experience conscious awareness of changes and these are often reinforced with patient initiated or spontaneous behavioral, attitudinal and affective changes.

Symptoms of stress disorders are defined by terms describing relationships of yin phenomena to yang phenomena; the quality of relationships of one phase to another; and/or the quality of energetic movement through the meridians or through the phases. Diagnosis of disorders is confirmed through reading the energy configuration in the radial artery at the wrist (pulse diagnosis). Stress



disorders can affect all major meridians and all energetic phases. Treatment of one energy meridian in systemic treatment affects all others. Therapeutic treatment (accomplished in acupuncture by needling specific points) results in predictable, systemic changes, verifiable by observation of changes in the pulses taken at the radial artery. All symptoms are rarely resolved in one treatment but over time, observable changes in symptoms are indicative of adaptive reorganization taking place. During the treatment and the healing process, two important things occur: one is that new occurrences of pathological energy are interrupted and balanced so that new stressors are not contributing to disease progression; the second is that during regression, the stages of progression are revisited temporarily. Psychological issues become available to conscious awareness (or just disappear) and re-evaluation from a significantly different perspective takes place. In systemic treatment, rather than symptomatic treatment, those changes are congruent with the individual's unique underlying organization, rate of integration and disease reversal process.

### The Interaction of Music with Meridian Energy

#### Western Perspectives and Relevant Research

Music can be described as one or more musical elements which interact, evolve, appear, disappear, modify, repeat and transform. Through the process of abstraction, this complex series of events attains a perceptual whole that is neither simple nor unique. What that perceptual identification is depends upon the psychophysiological state of the listener and the musical standpoint from which that listener observes the events (Camcerri, Haus & Zaccaria, 1986). In more

concrete terms, the simplest instance of music is a unique, pure-tone (sine wave) of any given frequency within the auditory range. Adding other musical elements such as melody, harmony, rhythm, tempo, volume, key and various instruments (timbre) creates a more highly-complex series of events which are so dynamic that defining "music" in any quantifiable terms becomes virtually impossible. However, without even an adequate definition for what "it" is, we do know that music, as information, is processed by each listener as a cognitive event, a sensory event, an emotional event, a frequency (mathematical) event and possibly a motor event. Both holographic and analytical modes of information processing are utilized in either "speaking" music or in understanding music. By speaking music I mean having (not necessarily exercising) the capacity to intentionally manipulate the culturally prescribed rules of harmony, silence, melody, key, rhythm, timbre, tempo, and volume to communicate one's own feeling state; to invoke feeling states in others; to communicate, for example, ideas, humor, or mathematical relationships; and to communicate a sense of who we are to other people without using words or even our physical presence. By understanding, I mean our individually specific, relative capacities to organize the manipulations and comprehend (not necessarily appreciate) what the musician has said. It is interesting to note that most people understand music although fewer "speak" musical language.

Almost none of the contemporary research has attempted to hold musical elements constant in studies looking at effects on human behavior. However, findings from the Western music therapy research indirectly suggest that music does interact with meridian energy some of the time. Given the nature of the

contemporary research, it is difficult to draw clear patterns regarding meridian energy interaction from the findings. Two researchers (Seki, 1983; Maman, 1990) in the field of acupuncture support the hypothesis that musical soundwaves directly interact with meridian energy. If we entertain the idea that soundwaves can create perturbations in the biomagnetic field through constructive or destructive interference with meridian energy waves, we have added another dimension of complexity to understanding or predicting the interactional effects of complex musical events with the whole of an individual.

Contemporary researchers, practitioners and educators (Unkefer, 1990; Gaston, 1968; David, Gfeller & Thaut, 1992) have looked at a wide range of musical properties in relation to people in a wide variety of settings. Since the nineteenth century, some attempts have been made to organize the wide range of musical events into categories. A two-category system--sedative or stimulative--has evolved on the basis of the effect of music on listeners or by the predicted effect (Taylor & Gaston, 1973; Smith & Morris, 1976; Fisher & Greenberg, 1972; Peretti & Swenson, 1974; and Scartelli, 1984; Lorch, Lorch, Diefendorf, & Earl, 1994). These categories are primarily defined by qualitative descriptions of volume, rhythm and tempo. Slow tempos, regular rhythms, and low volume are generally considered sedative. Faster tempos, martial or syncopated rhythms and higher volumes are considered stimulative. Other researchers have attempted to organize musical events in research projects by the sociological factors associated with them. These include such second-order characteristics as ethnic origin of the music, historical period of composition and socioeconomic group associated with improvisational or composed music. These attempts have led to categorizations



such as baroque, Renaissance, "ethnic," church, art, jazz, country, blues, rock 'n' roll, "classical" and folk music. These categories pay no attention to musical elements, *per se* (Quittner, 1980, as edited by McKinney, 1990; Jones, 1991; Standley, 1991; and Wilson & Aiken, 1977).

Other researchers (Bonny, 1978; Shatin, 1970; Gaston, 1951; and Pignatiello, Camp & Rasar, 1986) have focused on the "mood" of music or the "mood" of subjects based on subjective and consensual agreement by listeners or observers of either. No reference to sociological factors, to musical elements, *per se*, or to the predicted effect on listeners is critical to how definitions of "moods" in music are derived. Subjects' mood of interest in research is limited primarily to "depressed mood."

Preference research has focused on ascertaining or describing preferred musical styles (LeBlanc, 1979), periods of composition, activities and volume (Jonas, 1991). Conclusions are that these musical preferences are influenced by volume (Wilson & Aiken, 1977; Smith, 1988), background versus foreground (Scartelli, 1984; Curtis, 1986), style (Peretti, 1975), age (Gibbons, 1977; Pera, 1965), gender, educational levels (Bauman, 1960; Birch, 1963), activity with music (Thaut, 1983), extramusical associations (Gfeller, 1988), familiarity (Rohner & Miller, 1980), cultural context, past experiences (Davis & Thaut, 1989), and personality variables (Brim, 1978). Other researchers have focused only on "preferred" music when examining effects (Davis & Thaut, 1989).

Despite the relatively low interest, time or perceived competence in conducting research expressed by music therapists in the 1980s (Siegal, Cartwright & Katz, 1986), considerable experimental research, clinical studies, historical

studies, descriptive surveys and geographic studies have been conducted in the field as well as in nursing, health sciences, psychology, music research, exercise science and psychiatry. Most of the experimental research has focused on the effects of listening to music in relation to various behaviors. In these, emphasis was on the listening, *per se*, rather than on the musical event presented for hearing. Included in these studies were listening to music as it related to facilitating cognitive functions such as imagery (McKinney, 1990; Assagioli, 1965; Leuner, 1978; Grof, 1988; and Rider, 1987) or acquisition of language skills (Colwell, 1994); in improving memory and attention (Morton, Kirschner & Siegel, 1990). Some studies focused more on emotional responses to music (Stratton & Zalanowski, 1989), physiological measures of arousal (Barger, 1979; Wilson, 1957), anxiety (Perretti & Swenson, 1974; Liebman & MacLaren, 1991; Rohner & Miller, 1980; White, 1992; Robb, Nichols, Rutan, Bishop and Parker, 1995), relaxation (Rider, 1985), pain (Wolfe & Davis, 1978; Davis, 1992), autonomic stress behaviors (Caine, 1991), or immune function (Bartlett, Kaufman, & Smeltekop, 1993) in response to music. Some research has focused on brain (Brydon & Nugent, 1978) or brainwave activity (Standley & Madsen, 1990; Furman, 1978; Breitling, Guenther & Rondot, 1987). Still other researchers have examined behavioral changes in response to music (Beckett, 1990; Yarbrough, Charboneau & Wapnick, 1977). Some studies have examined musical behavior as a diagnostic tool for mania or depression (Spitzer & Endicott, 1977; Stein, 1977; Greden, Carroll, Feinberg, Haskett & Albala, 1979; and Migliore, 1984, as cited in Migliore, 1991).

The populations of people utilized in research efforts have included a broad range of normal, developmentally-delayed, physically or mentally ill people and special populations of varying ages, from neonatal to geriatric populations. Settings for research have included clinical, naturalistic and experimental situations (Standley & Madsen, 1990; Chetta, 1980; Curtis, 1986; Cripe, 1986; Furman, 1978; Darrow, 1991; Seki, 1983; Hairston, 1990; DiGiammarino, 1990; Wilson, 1990; and Schuster, 1985).

Findings from the current literature are generally in agreement that music is more effective when listened to (yin function) rather than performed (yang function) for altering moods or arousal levels (yang functions). Music with relatively slow tempo and even volume (yin qualities) which subjects *prefer* listening and relaxing to is conducive to facilitating the imagery process (every phase). It is generally agreed upon in the literature that music can effectively alter moods and reduce subjects' sensations of pain until the pain becomes very severe (Standley, 1986). Seki's (1983) research cites evidence of certain types of fluctuations in alpha waves characteristically present over a broad range of frequencies in "classical" music as fluctuations present in superlearning states but not in relaxation states. His research shows high rates of pain reduction when acupuncture points were stimulated with electrically-produced musical sound waves with classical music frequencies. Maman's (1990, unpublished) work suggests that effectiveness of therapeutic response to acupuncture point stimulation with musical sound waves is dependent upon which frequency vibration is used on which point.



Review of the literature regarding the influence of music on physiological processes related to levels of arousal, autonomic function, heart rate, (wood and fire phases) levels of anxiety, levels of relaxation (water and earth phases) and levels of stress hormones or stress (alarm stage) shows conflicting, contradictory and inconsistent results. Overall, however, the consensus is that music does effect stress responses positively. Predictability of effects remains a central issue. Methodological problems including inadequate controls, lack of standardized measuring techniques, lack of consensual operational definitions of terms and parameters being measured are some of the difficulties in both comparing findings from and in conducting music therapy research. Lack of consistency or common denominators in presentation of musical stimuli and difficulty in quantifying or categorizing musical stimuli provide another level of complication (Hanser, 1985). Currently, efforts are underway to improve research efforts in the field (Spintge & Droh, 1992).

It is noteworthy that almost none of the research has attempted to deliberately hold pitch, tempo, key or timbre constant in order to gain some understanding of which of these musical elements create differential effects on parameters measured. These four elements are the most easily quantifiable and stable musical elements. These elements supersede all other ways of categorizing musical selections including those that are "preferred" listening material for subjects.

Noticeably absent from the research literature are clear definitions of what constitutes "therapeutic," what a healing process looks like and how either would manifest for a given individual. Davis and Thaut (1989, p. 184) reiterate research

findings that the desired effects of music on psychophysiological parameters are dependent upon individual arousal (anxiety, relaxation) needs and physiological reactivity. In addition, the interplay of psychosocial factors, associations and personality variables with musical elements create "music" that is a unique entity for each listener.

### Ancient Taoist Perspectives: Music in the Systems of Correspondence

Music therapy was a functional part of ancient Chinese medicine. Integration of information related to Chinese medical music therapy is important in developing an approach to clinical application that is congruent with stress theory, Oriental medicine, contemporary psychotherapies and contemporary music therapy. Descriptions of psychological effects of music and attempts to categorize musical events are available in the ancient medical and philosophical writings. Early use of sound and music has been traced by Joseph Needham (1956). Musical sound was divided into categories, first into four and then into eight categories according to the quality of sound and by the instruments producing particular timbres. Pitch, volume, timbre, emotional quality, rhythm, position in space with respect to sound production, associations with ritual ceremonies, the seasons, direction and life experiences were all considered as factors in how musical sounds interacted with listeners (Lu, 1978; Munroe, 1980; Needham, 1956). Melodies were traditionally played in one or another key according to the month and the hour, so as to correspond to the seasonal and daily biorhythms associated with each of five evolutive phases. The right melody (pitch) played in the right key (one of five pentatonic modes) with the right timbre was considered

to have the power to sustain energetic harmony within an evolutive phase (Lu, 1978). My interpretation of the literature is that the most critical factors in effecting meridian energy were considered to be pitch, key, timbre and timing of the musical intervention.

In the medical literature, most significant of all musical elements was the pitch associated with each phase. There are numerous references in the medical literature (Nei Ching) to the correspondence of one of each of the Five Voices (musical sounds) to each of the five phases and the yin meridians: Kong: Earth (Spleen); Shang: Metal (Lungs); Yu: Water (Kidneys); Chio: Wood (Liver); and Chih: Fire (Heart). (Lu, 1978). These correspondences are described in the Nei Ching, as follows.

Liver corresponds to (Chio) Ziau (namely the middle sound . . . ) (Lu, 1978, p. 26).

Its (Liver) sound is Chio (Veith, 1972, p. 112).

The Heart corresponds to Zing in the five sounds (Lu, 1978, p. 26). . . its (Heart) sound is Chih. . . .

The Spleen corresponds to Kong in the five numbers (Lu, 1978, p. 27) . . . its (Spleen) sound is Kung. . . .

. . . the Lungs correspond to Shang (Lu, 1978, p. 28). . . its (Lungs) sound is Shang (Veith, 1972, p. 113). . . .

. . . and among the five sounds, the Kidneys correspond to (Yu) Yee, (the most high-pitched and purest) (Lu, 1978, p. 28). . . .  
. . . its (Kidneys) sound is Yu (Veith, 1972, p. 24). . . .

Other discussions in the Nei Ching are very specific as to how the sound of one phase affects another. It is suggested that, according to the "Second Law of the 5-Elements" (K'o Cycle), energy deficiencies in each element can be



partially transformed (tonified) by the energy (sound) of the subduing (limiting; controlling) element (Lu, 1978). Wood is partially transformed (tonified) by Shang (the sound associated with Metal). Fire is partially transformed (tonified) by Yu (the sound associated with Water). Earth is partially transformed (tonified) by Chio (the sound associated with Wood). Metal is partially transformed (tonified) by Chih (the sound associated with Fire). Water is partially transformed (tonified) by Kong (the sound associated with Earth). Noticeably, tonification but not sedation is prescribed, and only yin meridians have musical sounds.

Quantitative descriptions of the Five (functional) Voices associated with each phase and yin meridian is not definitive in ancient Chinese music. Manfred Porkert, linguist, sinologist, and preeminent scholar of Chinese medicine, suggests that the five sound emblems (five functional voices) cannot be reproduced musically (Porkert, 1974); i.e., specific pitches cannot be gleaned from the medical literature. Qualitative descriptions of musical sounds are available from the Tz'u Hai, as translated by Selah Chamberlain (Munroe, 1980).

Kong [Earth] is central, as is the high noble; it is a net for the far sounds. This sound is heavy and thick as the virtue of the nobleman is also serious and heavy." The image is that of the superior man, the palace (the hub of the wheel).

Shang [Metal] is clever. Shang organizes into chapters. It draws distinctions, categories, divisions." The image is of the Official, also of the Merchant. ("Tinkling setting up power of discrimination.")

What's called Chih [Fire] is varying and changing, it alternates, attacks, with repeated variations." Chih is happy; this sound

suppresses and spreads about. It is affairs, tactics to alternate with spiritness.

Yu [Water] is things. It is pleasant and gay. This sound lowers and is level. It covers over and glows brightly--by itself it is high and it is low. It is the five sounds gathered together.

(pp. 18-19)

(Brackets added by this author)

If pitch is most central in effective therapeutic interactions of musical soundwaves with meridian energy, to be congruent with the ancient Taoist theory it is necessary to know the pitch for each evolutive phase.

Unfortunately, Chinese medical scholars, historians and musicologists cannot agree on what the pitches were. There is agreement that the Five Voices describe functional relationships reflecting the order in which the tones are generated by modulating in fifths from a fundamental. It is agreed upon that a tone designated by its functional name always bears the same relationship to the fundamental and to the other functional voices. The first five tones obtained by modulating in fifths from a fundamental became the tones of the series that were used for eleven centuries (654 B.C. through 775 A.D.

Nakaseko, date unknown). These five tones were given functional names. The functional names were different from the names given to each pitch in the chromatic order of sounds. The functional names (Five Voices) are Kong, Shang, Chio, Chih and Yu (adapted from the Chao-Mei-Pa, 1934). The generation of the Five Voices by fifths, and the twelve semitones in the chromatic series (six yin and six yang) represent the Five-Element Theory and yin/yang cosmology, respectively. Together, they were symbolic of the cyclic

infinity of the universe. Among Western musicologists there is disagreement as to what the actual pitch of the fundamental tone was. Some sources suggest that it was the equivalent of "middle c" on the piano; others suggest that it was "d" (Apel, 1951), and another that it was "f" (Wellesz, 1957). Some sources (Apel, 1951) suggest that, based upon folk music (vocal) that has survived to the current time, the use of the Five Voices in the first mode (the Kong mode with middle c as the first tone) was the mode probably most commonly used. The closest equivalent contemporary tonal pattern is the key of C major.

These suggestions were not usable for determining a pitch for each phase congruent with the medical prescriptions. Through a very complicated process, I did, however, arrive at a theory for pitch equivalents which was congruent with other entries in the systems of correspondence and the mathematical references relative to the musical notes and modes in the Nei Ching (see Appendix, Figure 5). From a theory more complex than is needed here or for readers unfamiliar with music theory and Chinese medicine, the theory generated the hypotheses central to this study: Kong is a derived pitch from *the fundamental tone* (Yellow Bell) sounded at the auditory threshold for musical sound. All of the *functional voices* are partials generated from this same sound. The relationship of those sounds to the phases is a *temporal* relationship. Pure tone E (329.6 Hz) is the pure tone pitch equivalent to Kong generated from C<sub>2</sub>.



## Summary

The chapter began with the fight/flight syndrome where most of the current music therapy research has resulted in conflicting, contradictory but promising results. The field is trying to shoulder a medical model research methodology but applying one highly complex, interactional, dynamic process, i.e., music to (with) a group of dynamic interactional, *processing* processes, i.e., people. While music intervention rather than drug therapy, for example, for the treatment of anxiety may indeed be the least action necessary to initiate whole brain activity and attainment of healing states, the approach is reasonably unpredictable in effect. Given current bodies of knowledge relative to differential treatment effects of the various elements of music, the current approach is not likely to make significant progress in developing reliability very soon. Moving into research with the other stages of stress disorders will perhaps challenge this research area even more as different levels of pathology are engaged in disease progression, in the interaction with music, and in the interaction of differential treatment responses to each musical element.

Hans Seyle offers description and, like Eastern science, brings back into wholes the discreet parts Western science had dissected and subdivided. Oriental medicine offers both description and prescription in more than just another language. I attempted where I could to stretch Seyle's work forward and reach back from Oriental medicine to identify the common areas of conceptualization while retaining what I understand to be different but complementary and expansive concepts. They don't meet in the middle. With

at least 3,000 years of longitudinal study, the reliability and effectiveness of Oriental medicine are unquestionable. Both process descriptions challenge current psychiatric diagnostic categories, psychotherapeutic concepts of symptom substitution, resistance and even some current clinical practices in both psychotherapy and Western internal medicine. Both Seyle and Oriental medical theory remind us that stress disorders are not static but either progressive or regressive at any given moment. They both imply the necessity for individualizing treatment in clinical practice and in research methodology. They both offer generic conceptual frames flexible enough to accommodate the individually unique etiology, underlying organization, rates of integration, and sequence of reversal or regression of symptoms during the healing process. The integration of all the material demands new definitions in this field for desirable treatment goals, for evaluating treatment effects, for defining research questions, and for developing suitable methodologies.

## CHAPTER III

### METHOD

#### Introduction

The overall intent of this investigation and applied research pilot study was to further the development of an integrated systems model and to further inform the research efforts in the field. The specific purpose of the study was to clinically test the first of five pure tone musical pitches (E, 329.6 Hz) for effects on meridian energy. Analysis of those interactional dynamics resulting in congruence with Oriental medical and practice theory would tend to confirm my interpretive hypotheses relative to pitch equivalents to the musical notes in the systems of correspondence—the theoretical foundation of Oriental medicine. Knowledge of these pitch equivalents, now lost to antiquity, would contribute to understanding the treatment effects of the musical elements, pitch, key and timbre on meridian energy. Greater understanding of these effects would inform the development of more therapeutically predictable music interventions.

Music as a whole perceptual experience is replete with effects on people but predictability of musical intervention treatment effects in psychotherapy for people with stress disorders remains a central issue in clinical practice. Research in the field has been hampered by innumerable methodological difficulties and cognitive frames too narrow to interpret and integrate conflicting research results and clinical observations into effective therapeutic techniques. At the current time there is little knowledge of the effects of pitch, timbre, or key of music on human behavior or psychophysiological measures. Currently, there is almost no



empirical evidence for knowledge of the dynamics of clinically observed effects of music on meridian energy.

Synthesis of cross cultural and interdisciplinary methods of inquiry, theories, bodies of knowledge and clinical techniques enabled me to create a sufficiently comprehensive frame within which to conceptualize clinical problems and research strategies. In conceptualizing from a different perspective, some of the methodological limitations currently pressing researchers and clinicians are reduced. In an almost ironic twist of logic, use of such a frame allows for re-definition of treatment outcome measures so as to subsume and delimit the almost infinite range of discrete psychophysiological stress disorder symptoms. Likewise, such a frame enables us to bypass the perceptually unique experience of music for subjects and to quantify a musical event.

The primary theory that is being tested is that E (329.6 Hz) will interact with meridian energy congruent with ancient Taoist prescriptions for use of musical sound. Interrelated and specific research hypotheses are included in the Data Analysis section of the chapter with discussion of the rationale for each.

Since there is no prior research design to use as models, in order to propel this research it is necessary to create a research design which (a) isolates one element of music—pitch—from the perceptual whole that a musical experience normally embodies without losing the essence of a musical event; (b) provides experience of that pitch as a pure-tone comparable in amplitude to partials generated by musical instruments (but without instrumental timbre); (c) defines the most generic treatment outcome or precursor event to adaptive reorganization that is clinically observable and therapeutic. The latter is important for

accommodating individual variability in symptom presentation, rate of response to intervention and individually-specific reorganization processes. It is also necessary to (d) define an appropriate subject sample and (e) to define a procedure for administering the pitch, observing meridian energy effects, and recording those effects in a way that is suitable for applying statistical procedures necessary for hypotheses testing and interpretation relevant to the overall purpose of the study.

### Overview

A tuning fork was chosen as the source of musical sound since it met the necessary criteria for musical properties, was inexpensive, easily available, and reliable relative to frequency production. Direct stimulation of six yin meridian acupuncture points congruent with my hypotheses relative to expected treatment effects and dynamics of therapeutic process were chosen as the procedure and as the energetic sites from which to gather observations. Treatment effects would be immediate, palpable and the most generic treatment effect observable if present. Licensed acupuncturists were chosen as the most diagnostically reliable, knowledgeable people to provide therapeutically appropriate administration of the experimental procedure, to observe and record meridian energy effects, and to handle any crises that might occur as a result of the experimental treatment. They also had access to a pool of potential volunteers already familiar with feeling states associated with meridian energy change for needling comparison feed-back. Patients in acupuncture treatment with a variety of disorders were the preferred subject pool. With a wide variety of disorders represented in the sample,

response pattern analysis could, and by necessity, must go beneath psychophysiological measures to underlying energy movement suitable for generalization to development of clinical applications for a wide range of disorders. Details and more in-depth discussion of the rationale for the study design and considerations included in the method relative to modifications in the design for future research are included in the following descriptions of design elements.

### Design of the Study

#### Subjects

A total of fifty-six people volunteered to participate in the study. Each subject was a person already engaged in acupuncture therapy for some mental or physical disorder. Subjects were patients in treatment with acupuncturists in Massachusetts, California, Maine, Arizona, Colorado and Florida. The criterion for inclusion in the study was that the subject's practitioner diagnosed that treatment of one of the selected yin meridian acupuncture points during the period of time in which the study was conducted would be therapeutically beneficial. Subjects requiring treatment on these points who participated in the study were not randomly selected from the population of people in acupuncture treatment or from the population of people requiring treatment on these points.

Neither a common Western nor a common Eastern diagnosis was required for inclusion in the study. Western diagnoses included but were not limited to pre-menstrual syndrome, brain tumor, breast cancer, sciatica, anxiety disorder, bipolar disorder, diabetes, glaucoma, menstrual irregularity, menopausal



symptoms, frequent colds, pneumonia, allergies, chronic headaches and insomnia. Eastern diagnoses included subjects with energetic pathology in each of the five evolutive phases.

The age of participants ranged from 21 to 61 years of age. Of the fifty-six people, thirty-eight were female, eleven were male and the sex of seven participants was unknown due to incomplete information provided by the acupuncturists.

Practitioners who participated in the study as data collectors invited patients to participate in the study. Each patient was given a letter of explanation from the researcher. In addition, both the purpose of the study and the procedure were explained verbally to the subjects by the patients' practitioners. Patients were invited to contact the researcher for further explanation and each signed an informed consent form prior to volunteering for the study (see Appendix).

### Equipment

Sound waves for the study were produced with a stainless steel tuning fork calibrated to vibrate at 329.6 Hz (E). In order to provide comparable amplitude of the soundwave among practitioners, each practitioner was provided with a small stone of comparable size, weight and composition upon which to strike the fork. The amplitude was considered to be standardized when the fork resonated for approximately fifteen seconds within the audible range. A stimulation (test) lasted until the vibration ceased to be felt in the practitioner's fingers (fifteen to twenty seconds).

## Data Collection

Data collection occurred within the context of a professional acupuncture treatment session in whatever location the participating practitioner normally conducted treatment of patients. The experimental procedure was conducted by licensed acupuncturists who volunteered to assist in the research. Only professionals with excellent professional reputations, extensive clinical experience and excellent training credentials participated in the study. All the participating practitioners were trained in the Worsley method of acupuncture either in the United States or England or both. A total of seven acupuncturists provided data for the study. Two of the data collectors were M.D.s as well as graduates of full practitioner training. The other data collectors were fully-licensed practitioners with advanced degrees in Oriental medical practice. Data were collected over a period of two and one-half years.

To locate acupuncturists for the study, both acquaintances and peer recommendations selected from a list of graduates of the Traditional Acupuncture Institute in Maryland and/or the College of Traditional Chinese Acupuncture, U.K., were contacted. Initial contact was by telephone or letter. Telephone calls were followed with a letter, and letters were followed with telephone calls by the researcher. A summary of the study was given to each potential participant and each was given the opportunity to ask questions regarding the procedure or theory. Care was taken to inform each to the same degree. None were told what to expect for results and none were told what sound wave frequency was being tested. Each acupuncturist who tentatively agreed to participate was sent a procedures manual and invited to ask questions of the researcher before

beginning the experimental procedure. This procedures manual included subject consent forms, acupuncture practitioner agreement forms, a letter of explanation to subjects, forms necessary for recording data, a description of the procedure and the equipment needed to conduct the study (see Appendix). Frequent telephone and letter contact was maintained with practitioners by the researcher during the period of data collection.

### Experimental Procedure

The points selected for treatment were  $I_7$  ,  $IV_3$  ,  $V_7$  ,  $VIII_3$  ,  $IX_9$  ,  $XII_3$  (see Appendix, Figure 4 for anatomical locations). During the period of data collection, anytime one of these selected yin meridian Earth points (Worsley, 1982) was therapeutically indicated for any of the participating patients, the data collector/acupuncturist stimulated the selected point with the tuning fork provided by the researcher. Practitioners used their own judgment as to when in the treatment session stimulation of the point would take place, congruent with normal and standard acupuncture practice. Therapeutic treatment needs assessment was made and, as is generally practiced, radial pulses were taken both before and after the experimental procedure. Practitioners compared results of the stimulation of the yin source point against criteria normally used by that practitioner in acupuncture therapy. Based on this comparison, the practitioner described and recorded the patient's pulse change as "no change," "better" or "worse." The practitioner also recorded "no change," "better" or "worse" for color, sound of the voice, odor and emotion. The practitioner then needled the point only if necessary in order to complete a therapeutic session with the patient. The



first time the sound wave was used with the patient, this treatment was called the test trial.

Each patient was tested again on the same point that was stimulated the first time. The second stimulation was called the re-test trial, and the re-test trial was conducted between fifteen and seventy days later, but only if the same point was therapeutically indicated within the time period required. Again, the practitioner made the clinical decision as to whether needling was indicated to complete a therapeutic session. In most cases, needling was done only if there had been "no change" or "worse" findings upon completion of the trial. In almost all cases, where "better" was denoted as the result of the test, needling was not conducted on the yin meridian Earth point.

### Data Analysis

For each subject, a number of measures were recorded, including the following: sex; age; principal energetic imbalance (CF, or causative factor); point selected for treatment in both the test and re-test trials; results of the stimulation; whether or not needling was done; season in which the test was conducted; and musical preferences, including subjects' favorite musical instruments and styles of music. In addition, comments made by subjects in response to the procedure and practitioner observations of interest were recorded. A sample of the data recording form is included in the Procedures Manual (see Appendix).

Given the longevity of acupuncture therapy across cultures and the predictive validity of pulse diagnosis (state-of-the-art technique), it was assumed that practitioner comparisons of pulse readings during the experimental

procedures to ones expected from needling were valid and reliable measures of meridian change. It was decided to use a nominal scale to make data collection and recording as easy as possible for the data collectors without losing the descriptive integrity of pulse changes. Without prior needling, soundwave stimulation, or inter-rater (inter-practitioner) reliability tests, it was decided to use three mutually-exclusive categories of response in order to maximize the inter-rater reliability and the number of observations in each category. The three response categories were "better," "worse" and "no change." The data obtained from the experimental procedure were analyzed without regard to formal inter-practitioner reliability tests. Since all the acupuncturists were graduates of the same training institution(s), it was assumed that there would be consistency in pulse diagnosis, in judging response to treatment with the soundwave, and in assignment of treatment outcome to one of the three response categories.

Because of the time limit and the criterion for re-test trials that the points be therapeutically indicated for each patient within the time limits for the re-test trials, thirteen of the fifty-six subjects did not have re-test data. Primary analysis of the data was limited to the forty-three subjects for whom there were both test and re-test measures of response to the sine wave stimulation. Analysis of instrumental preferences included all fifty-six subjects.

Subject selection, equipment used, administration of the experimental procedure, rationale for point selection, recording of observations, and other information requested about subjects were designed towards testing the following research hypotheses.

Hypothesis 1. Musical sound waves interact with meridian energy. It was expected that this interaction would be both palpable in the radial pulse and observable as changes in color, sound, odor and emotion at the time of point stimulation. If responsivity were attributable to the interaction of sound waves and the meridian energy, one would expect relative agreement between test and re-test measures of responsivity. If the changes in pulse reading were attributable to individual variability or random pulse changes, one would expect little or no relationship between test and re-test data. If responsivity were due to novel stimulation, one would expect higher rates of responsivity on the test data than on the re-test data. If responsivity were due to cumulative or learned responses, one would expect higher rates of responsivity on the re-test trials than on the test trials. Confirmation of this hypothesis required relative agreement between test and re-test trials. In addition, comments from subjects or practitioners would also inform conclusions drawn in regard to this hypothesis.

Hypothesis 2. The mechanism of interaction of musical sound waves with meridian energy is the result of musical wave patterns cancelling, augmenting or otherwise interfering with the wave patterns associated with subjects' individually-specific systemic meridian energy wave patterns. Because the stimulation with musical sound waves was devoid of musical context, it was expected that palpable pulse changes could be attributed to the soundwave stimulation rather than to a musical perceptual whole. Because the pressure waves were thought to be below the threshold for the sensation of touch and barely audible to someone with acute hearing, it was expected that most people would not be aware of any sensation other than that sometimes experienced by people along the path of the energy



meridian. Palpable pulse changes in response to sound waves could not then be attributed to the sensation of touch. Support for this hypothesis was dependent upon data that showed patterns in rates of responsivity among subjects, by subjects' reports and by practitioners' observations and comments. Such findings could not, however, rule out the possibility that the mechanism of interaction was due to nervous system reactivity via audition or touch.

Hypothesis 3. Certain points (the yin meridian Earth points selected for treatment in this study) could be safely and effectively treated with the experimental frequency. While it was expected that there would be some therapeutic and some non-therapeutic interaction of the frequency with meridian energy as a result of stimulating these points, it was expected that therapeutic and non-therapeutic responses would be palpable and categorized as "better" or "no change," but not as "worse." It was expected that analysis of the data would reveal significant differences between the frequency distributions of "better" or "no change" responses and the "worse" category.

Hypothesis 4. Therapeutic responsivity to sound waves is not individually-specific. This hypothesis is in contradistinction to the findings from Western music therapy research which show a great deal of individual variability in response to whole musical events. My theory is that the individual variability in therapeutic outcome is due to meridian energy interaction upon exposure to a musical whole which sometimes catalyzes therapeutic meridian energy change and sometimes non-therapeutic change. If meridian energy interaction with musical sound waves were individually-specific, i.e., contained no universal patterns, one would expect to see few or no patterns emerge from the data analysis. It was

expected, however, that frequency distributions of the response categories would vary as a function of one or more of the parameters important in Oriental medicine including principal energetic imbalance (CF), meridian treated, pitch used, point used in treatment, function of the point used in treatment and season of the year in which treatment occurred.

Hypothesis 5. The musical sound waves which interact with meridian energy are the pure-tone partials generated from a fundamental pitch rather than with the fundamental pitch (with timbre) itself. Based on interpretation of the Nei Ching, I am suggesting that Kong, the sound associated through the systems of correspondence with the Earth evolutive phase, is a derived pitch (329.6 Hz) conceptualized from *the fundamental* sounded at the auditory threshold for musical sound and generated from *a fundamental*,  $C_2$ . Agreement between test and re-test data would provide some support for this hypothesis. Without comparison to treatment with a fundamental pitch (with timbre), one could not ascertain if partials were more effective than or equivalent to fundamentals composed of a series of sequentially and concurrently sounding partials. If the derived pure tone E were Kong, one would expect to see higher rates of therapeutic responsivity and more qualitatively consistent responses to treatment when either  $XII_3$  (the Earth point) or  $IV_3$  was treated than when other points were treated. Such findings for  $IV_3$  would indicate that the frequency in this study is effective in tonifying deficient Water energy via the K'o cycle. If the Shen cycle were activated, one would expect to see higher rates of therapeutic response and more qualitatively consistent responses to treatment when  $IX_9$  (Metal) was treated. If the violation cycle were activated one would expect to see lower rates

of therapeutic responses when VIII<sub>3</sub> (Wood) was treated. If appropriate sedation effects occurred, they would show as lower rates of therapeutic response when V<sub>7</sub> (Fire) was treated. If E (329.6 Hz) were the musical pitch associated with any other phase than the Earth phase, different points from those tested in the study would be expected to show differential response rates. Without comparison to results using E (329.6 Hz) on points other than those used in this study, findings could support Hypothesis 5 but could not confirm that interpretive hypothesis.

Hypothesis 6. The therapeutic interaction of specific sound waves and meridian energy is accomplished according to principles of therapeutic process described in the ancient Taoist medical literature (Lu, v. II, p. 470-75). According to these principles, deficient energy may be tonified by sound via the K'o cycle. Higher rates of therapeutic responsivity on IV<sub>3</sub> would support the K'o cycle to be the therapeutic process acting. Deviation from those findings with higher rates of therapeutic or non-therapeutic response on other points would indicate the occurrence of sedation (V<sub>7</sub>), or energy changes via the Shen cycle (IX<sub>9</sub>) or the violation cycle (VIII<sub>3</sub>).

Hypothesis 7. One of five frequencies is effective in catalyzing therapeutic change in the energy of each of the major yin meridians. Because all points were Earth points, and treated as source points, an alternative expectation was that there would be no difference in frequency distributions in the response categories as a function of the point treated, but, rather, as a function of the meridian treated. In order to support Hypothesis 7, it was expected that data analysis would show significant differences in responsivity as a function of the meridian treated with the test frequency. Discrimination between pitch specificity and



meridian specificity could only be determined by comparing data collected from other frequencies.

Hypothesis 8. The therapeutic effectiveness of the experimental frequency is contingent upon which of the yin meridian acupuncture points is treated. It was expected that there would be significant differences in the frequency distributions of each response category as a function of the point treated. Although all points were source points, some points functioned as sedation points ( $I_7$ ,  $V_7$ ,  $VIII_3$ ), some as tonification points ( $IV_3$ ,  $IX_9$ ), and one that functioned as neither a sedation nor tonification point ( $XII_3$ ). If responsivity of the points were cps-specific or functionally-mutable as a result of sound wave treatment, one would expect to see higher rates of therapeutic responsivity on  $IV_3$ ,  $IX_9$  and  $XII_3$ . Patterns of responsivity as a function of point treated would inform conclusions regarding hypotheses 3, 5, 6 and 7.

Hypothesis 9. Therapeutic responsivity to sound waves does not vary as a function of principal energetic imbalance. Nowhere in the Nei Ching was it explicitly suggested that this would be so, although the Nei Ching was very clear that therapeutic responsivity varies as a function of pitch and the need for tonification of deficient energy. It was expected that analysis of the data would not show significant differences in responsivity to the sound waves as a function of principal energetic imbalance.

Hypothesis 10. Therapeutic responsivity to specific sound waves does not vary as a function of the season of the year in which treatment is rendered. It was expected that frequency distributions in response categories would not vary as a function of season. It was felt by this researcher that the variability of response

attributed to seasonal specificity of sound alluded to in the Nei Ching was more related to bringing music theory into the system of correspondence than it was to bringing musical sound into medical theory. Selection of a fifteen- to seventy-two-day window for the re-test was a conciliatory design element that took into account the possibility that variability by season could occur.

Hypothesis 11. Therapeutic responsivity to sound waves does not vary as a function of sociological factors such as age or gender. The overall therapeutic rate of needle stimulation response is not dependent upon or associated with sociological aspects of age or gender. For the soundwave stimulation to be equally as effective and/or predictable, the therapeutic response to specific frequencies must also be independent of or not associated with those variables. While it is understandable that outcome measures in response to whole musical experiences would vary as a function of, e.g., age and gender, it is not logical to expect such differences to show in response to a particular frequency extracted from a musical idea and perceptual whole.

Hypothesis 12. Instrumental and musical preferences are contingent upon a subject's primary or principal energetic imbalance such that instrumental and other musical preferences can be used to diagnose meridian energy imbalance. This hypothesis is congruent with findings in the Western music therapy research which showed preferred music when listened to as more effective in promoting concentration, relaxation, spontaneous imagery and movement. Listening to preferred music was not necessarily related to psychophysiological changes in stress response measures. It is felt by this researcher that preferences in music are a projective test of energetic imbalance and that listening to preferred music is

essentially "self-medication," either wisely administered to assist energetic change or unwisely administered to assist maintenance of a pathological state. It was expected that analysis of the data would show significant differences in musical preferences as a function of principal energetic imbalance. Such findings would go a long way in offering an explanation about the variability of stress response measures in response to musical experiences.

Because this is a pilot study, an integral part of the study will also include meta-analysis of the design and integration of feedback from participating acupuncturists relative to administration of the experimental procedure, recording form and patient participation. No formal written evaluation of the process will be conducted.



## CHAPTER IV

### FINDINGS

#### Introduction

Because this was a pilot study requiring more technical data for confirmation or disconfirmation of the hypotheses being tested, only a description of findings are presented here. Findings are presented in this chapter without explicit intention to interpret the relevance of findings to the overall purpose of the study. Detailed and interdependent technical findings from each analytic technique and for each of the hypotheses tested are reported in this chapter. Presentation of the findings is organized by the main objectives of the data analysis. Reasons for the use of an analytic technique are given with the findings from use of that technique in each section. In a number of cases, tests for significance resulted in findings relative to more than one research hypothesis. A brief non-interpretive summary is provided at the end of this chapter.

A summary of significant findings, discussion and interpretation of those findings as they relate to the overall intent of the study are presented in Chapter V. For those readers not conversant in the language or theory of Oriental medicine, the details of this chapter may be easier to understand if readers first review the summary in Chapter V (Page 80) where significant findings are discussed in more commonly understood language.

## Overview of Data Analysis

Findings from the study resulted from (a) analysis of test and re-test treatment results of matched pair musical sound wave stimulation of five pre-selected yin meridian acupuncture points; (b) information regarding which points were treated, subjects' age, principal energetic imbalance and season of the year treatment was administered; (c) subjects' answers to questions regarding musical preferences; and (c) comments from patients and participating acupuncturists regarding the experience of the procedure. The primary objectives of the data analysis was to provide empirical evidence which tended to either confirm or disconfirm that (a) there were changes in meridian energy as a result of treatment with the musical sound wave; (b) the variability in treatment responses was associated with one or more of the following factors: the point, meridian, or function of the point treated; principal energetic imbalance, season of treatment, age; (c) musical preferences were associated with principal energetic imbalance. Experiential evidence (d) collated from participating acupuncturists and subjects' comments about the procedure was also examined. Inferences were drawn from these findings relative to each hypothesis tested.

Two analytic techniques were used to test the data for response patterns. The first technique, the Stuart Maxwell statistic (Fleiss, 1973) was employed as a measure of agreement between the test and re-test data. Findings from use of these tests provided empirical evidence relevant to the validity of the testing procedure and reliability of change in the meridian energy as a result of treatment.

Findings from use of the other technique provided empirical evidence to identify those factors which were associated with variability of *treatment* effects and those variables associated with *therapeutic* effects. These identifications were necessary for drawing inferences relative to the predictability of therapeutic effects and to diagnosis in clinical applications. The second technique, tests for significant differences between multinomial proportions, both independent and not independent (Fleiss, 1981), was employed as tests for significant differences between the relative frequency distributions in the three and two mutually exclusive treatment response categories. This same technique was used as tests of association between treatment response categories and (a) point (meridian) treated; (b) points treated and grouped by therapeutic function; (c) principal energetic imbalance; (d) season of treatment; and (e) age of the subjects. The second technique, a test for significant differences between multinomial proportions was also used as a test of association between principal energetic imbalance and musical preferences.

### Description of Findings

#### Changes in Meridian Energy

The first analysis was conducted as a measure of relative agreement between the test and re-test distributions for the three mutually exclusive response



categories obtained from the matched-pair point stimulations. A statistically significant degree of agreement between the test and re-test response distributions would provide some measure of both the extent to which the palpable responses reflected sound wave/meridian energy interaction and the reliability of the repeated measures. Lack of agreement between the test and re-test response distributions would indicate sampling error, random pulse changes, observations that were the result of novel stimulation, cumulative or learned responses, individual variability in sensory perception (touch or audition), or individually specific responses to musical sounds which vary over time. The Stuart Maxwell statistic was used to obtain a chi-square (2df) for assessing the significance of differences across the three outcome categories ( $k=3$ ) for the test and re-test ( $N=43$ ). The null hypothesis stated that, in the population, the frequency distributions of observations in each of the three response categories obtained in the test did not differ from the frequency distributions of observations in each of the three response categories in the re-test. The critical value for a 2-tailed test for significance (.05) is 5.99. The obtained value of  $\chi^2$  was only 1.58 ( $<5.99$ ), so the null hypothesis was not rejected. There was good agreement between the test and re-test distributions. The inference was made that the distributions in the response categories for the test did not differ from those for the re-test. Since the frequency distributions in each of the three outcome categories—"no change," "better," and "worse"—between the test and re-test did not differ, no further analysis to find those single response categories for which the differences were significant was necessary.

These findings support Hypothesis 1, which stated that musical sound waves interact with meridian energy, and offer partial support for Hypothesis 2, which stated that the mechanism of interaction of musical sound waves with meridian energy is the result of musical wave patterns canceling, augmenting, or otherwise interfering with the wave patterns associated with subjects' individually specific systemic meridian energy wave patterns. These findings also support Hypothesis 4, which stated that therapeutic responsivity to musical sound waves is not individually specific. Hypothesis 5 stated that the musical sound waves which interact with meridian energy are the pure-tone partials generated from a fundamental pitch. Since a pure-tone was used in the study, the above findings provide some support for Hypothesis 5.

#### Variability in Treatment Response

Since differences in the frequency distributions in each response category within the test data were observed, the data were treated with a second type of analytic technique. Only data from the first test of the 43 matched pairs were used for the analysis. Distribution frequencies were converted to relative frequency distributions (proportions). Tests for significant differences between not independent proportions between each response category were calculated. The null hypotheses tested stated that, in the population, the proportions in each response category did not differ (better = no change = worse). Comparison of the proportions with the widest spread (better = worse) for  $p=.05$ , critical value 1.96, resulted in  $z=1.5$ . The null hypotheses were not rejected. By inference, it was assumed that there were no significant differences in the proportions among

the response categories. Hypothesis 3 stated that certain points on the yin meridians (source points) can be safely and effectively treated with the experimental frequency. The above findings support the "safely" part of the hypothesis, but not the "effectively" part of the hypothesis. Because of the small number of observations in the test data, differences may have existed, but the sample was too small for those differences to have shown as statistically significant. When observations from other subjects for whom there were only test data available were included in similar calculations, significant differences did result. This suggested that, with a larger sample of matched pair observations, statistically significant differences might have shown (better > no change > worse). Gradient trends suggested there might be differences in the distributions if they were examined as a function of the points treated. Because of these trends in the data, further analyses were conducted.

As a test of association between each response category (better, worse, no change) and individual points, additional tests for significant differences in not independent proportions were calculated for tests using the relative frequency distributions in the three mutually exclusive response categories. The same technique, a test for significant differences between multinomial (not independent) proportions was calculated using test data collapsed into two, not mutually exclusive response categories: "no risk" (no change + better); "non-therapeutic" (no change + worse). The "better" category was relabeled as "therapeutic" (in contrast to "non-therapeutic"). These changes were made (a) to increase the number of observations in each response category and (b) to provide



evidence to differentiate "safely" and "effectively." The following list shows each response category for which comparisons were made:

- a. better = no change = worse
- b. no risk = worse
- c. therapeutic = non-therapeutic

The null hypotheses stated that, in the population, the relative frequency distributions (proportions) of observations in each of the response categories did not differ as a function of the individual points (meridians) treated.

Results of the tests for significant differences in response category proportions as a function of individual points (meridians) treated showed some significant differences. All of the null hypotheses for  $V_7$  were not rejected. By inference, it was assumed that there were no differences in the relative frequency distributions among the response categories as a function of treatment on that point ( $p = .05$ , critical value = 1.96). It was also noted that, because of the small number of observations on  $V_7$ , differences may have existed, but this sample was too small for those differences to have shown.

As a result of testing the "better = worse" hypothesis, the null hypothesis was rejected for each of three points in which the proportion of "better" was not equal to the proportion of "worse" (for  $p=.05$ , critical value = 1.96). By inference, it was assumed that, for  $IV_3$  ( $z=4.88$ ),  $IX_9$  ( $z=2.03$ ), and  $XII_3$  ( $z=6.14$ ), the proportion "better" was significantly greater than the proportion "worse." These same three points showed significant differences in proportions as a result of the "no-risk" = "worse" null hypothesis testing. Again, the null hypothesis was rejected and it was inferred that, for  $IV_3$  ( $z>4.88$ ),  $IX_9$  ( $z>2.03$ ), and  $IX_3$  ( $z>6.14$ ),

the proportion of those subjects whose response to treatment was in the no-risk category was greater than those in the category "worse" ( $p=.05$ ). For all other tests for significant differences between response categories, the null hypotheses were not rejected. Proportions in all other response categories for these three points were assumed to be equal ( $z<1.96$ ). One additional test for significant differences between the independent proportions within the "better" response category among those points for which "better  $\neq$  worse" ( $IV_3$ ,  $IX_9$ ,  $XII_3$ ) failed to show any significance. The null hypothesis stated that the relative frequency distribution in the "better" category for  $IV_3=IX_9=XII_3$  were accepted and, by inference, the proportion "better" on  $IV_3$  (.83),  $IX_9$  (.67), and  $XII_3$  (.79) were assumed to be equal. No significant difference among these points for proportion of subjects in "better" was found.

Analysis of the relative distribution of responses as a function of treatment on point  $VIII_3$  showed no difference and the decision was made to reject the null hypothesis ( $p=.05$ ) stated as "no risk = worse." By inference, it was assumed that, on  $VIII_3$ , the "no risk" proportion was greater than the "worse" proportion. For all other tests between response category proportions, no significant differences were found.

Tests for significant differences in proportions as a function of treatment of point  $I_7$  found differences of statistical significance ( $p=.05$ ) for the null hypothesis stated as "worse = no change" ( $z=2.14$ ). The null hypothesis was rejected and it was assumed that the proportion of subjects who experienced "worse" in response to treatment was greater than those who experienced "no change." Results of all other tests for significant differences between proportions in response categories

as a function of individual points showed none ( $z < 1.96$ ) and the null hypotheses were not rejected. For a summary of the significant findings, see Table 1 (Appendix).

These findings support the hypothesis that therapeutic responsivity is not individually specific (Hypothesis 4) but therapeutic responsivity does vary as a function of meridian or point treated. The findings only suggest support for Hypothesis 7, which stated that one of five experimental frequencies is effective in catalyzing the therapeutic change in the energy of each of the major yin meridians. The results did not confirm that when using E (329.6 Hz), the proportion of "better," "therapeutic," or "no-risk" was greater than "worse" when meridians I and V were treated. The finding that treatment on I, showed "worse" as greater than "no change" tends to disconfirm Hypothesis 3, which stated that certain points on the yin meridian (all the ones used in this study) could be safely and effectively treated with the experimental frequency. The findings did support Hypothesis 8, which stated that therapeutic effectiveness of the experimental frequency is contingent upon which of the yin meridian points is treated.

As a test of association between each response category and points grouped by function, tests for significant differences in not independent proportions were also calculated. The same response categories used for individual points were used in calculations for points grouped by function. The reasons for these tests was to provide evidence necessary to describe the dynamics of treatment response patterns relative to therapeutic process principles in Oriental medicine. The null hypothesis stated that, in the population, the relative frequency distributions (proportions) of observations in each of the response



categories did not differ as a function of the therapeutic functions of the points treated.

Results of the tests for significant differences in the relative frequency distributions between each response category as a function of points grouped by therapeutic function showed some significant differences. This grouping compared proportions in each response category as a function of treatment on tonification, sedation, XIII<sub>3</sub>, (entry) and source points. Tonification showed "better  $\neq$  worse" ( $z=4.92$ ). Sedation points showed no significant differences between any response categories. For point XII<sub>3</sub>, it was found that the proportion of observations in the "no risk" category was not equal to the proportion in the "worse" category ( $z>6.14$ ), and those in "better" were not equal to those in the "worse" category ( $z=6.14$ ). When removing observations from I<sub>7</sub> and recalculating source point differences, the proportion "better" (.71) was not equal to the proportion "worse" (.03) and "no risk" (.97) was not equal to "worse" ( $z=3.0$ ). All other results of tests for significant differences in relative frequency distributions between other response categories when points were grouped by function showed no significant differences. For all other response categories, the null hypotheses were not rejected and the frequency distributions among all the other response categories were assumed to be equal ( $z<1.96$ ). The significant findings are summarized in Table 2 (Appendix). Trends in the data suggest a probability gradient such that comparison of points by function in the "better" and "no risk" category resulted in Earth >tonification>source>sedation (p approaching .05).

These findings support Hypothesis 8 and provide some support for Hypothesis 6, which stated that therapeutic interaction of specific sound waves and meridian energy is accomplished according to principles of therapeutic processes described in the ancient Taoist medical literature (see Chapter III, p. ?).

Tests for significant differences in independent proportions were also conducted as a test of association between response category proportions and each of the following: principal energetic imbalance (CF), season tested, and subjects' age. In these tests of association, only comparisons of the relative frequency distributions within the "better" and "no-risk" categories as a function of principal energetic imbalance were calculated.

The null hypotheses stated that the relative frequency distribution of "better" (and "no risk") for any given principal energetic imbalance (CF) would not differ from the others (Water = Wood = Fire = Earth = Metal). Results of the testing showed no statistically significant differences within each of the two response category proportions as a function of (CF) principal energetic imbalance. When comparing the relative frequency distributions within the "better" (therapeutic) distribution, trends in the probability gradient suggested only the possibility that the proportion "better" (therapeutic) for Water CFs was not equal to the proportion in the "better" (therapeutic) category for Fire ( $p < .10$ ), Wood ( $p < .20$ ) or Metal CFs ( $p < .20$ ). For this test, however, the null hypothesis was not rejected. It was not assumed that the proportion of "better" for Water CFs was greater than the proportion "better" for Fire, Wood, or Metal CFs since  $p > .05$ . Trends in the data suggest that therapeutic response may vary as a function of principal energetic imbalance of the person being treated and that people with a

principal energetic imbalance in the Water phase may have experienced a higher rate of therapeutic response to treatment than did people with principal energetic imbalances in the Fire, Wood or Metal phases *irrespective* of which points were treated. Trends in the findings are summarized in Table 3 (Appendix).

When comparing the relative frequency distributions within the "no risk" response category, trends in the results showed that Fire CF proportions were not equal to the Earth CF ( $p < .10$ ) or Metal CF ( $p < .20$ ) proportions. Because the probability was greater than .05, the null hypothesis was not rejected and it was assumed that the proportion of "no risk" responses were observed equally for each CF group. Trends in the data suggest that people with principal energetic imbalances in the Earth and Metal phases had a higher rate of "no risk" response to treatment than did people with principal energetic imbalances in the Fire phase *irrespective* of which points were treated. Trends in the findings are summarized in Table 3 (Appendix).

Results of testing for an association of statistical significance within "therapeutic" and "no risk" response categories as a function of principal energetic imbalance do support Hypothesis 9. This hypothesis stated that therapeutic responsivity (implied *any* responsivity) does not vary as a function of the principal energetic imbalance. However, trends in the data suggest non-support for Hypothesis 9.

The same tests of association were calculated for "therapeutic" response and "no risk" response categories as a function of the season in which treatment occurred. When testing for significant differences between proportions within the "better" and "no risk" categories as a function of the season in which treatment



occurred, the null hypothesis stated that the relative frequency distributions of "better" and "no risk" for any given season would not differ from the others (fall=winter=spring=late summer). No statistically significant ( $p=.05$ ) were found. Each of the null hypotheses was not rejected and by inference, it was assumed that therapeutic responsivity did not vary as a function of the season in which treatment occurred. These findings provide no support for Hypothesis 10, which stated that therapeutic responsivity to sound waves varies as a function of the season in the year in which treatment occurred. Trends in the probability gradient, however, did suggest that the proportion of late summer therapeutic responses may have been greater than any other season with late summer > winter ( $p<.20$  approaching .10). This finding lends marginal support for Hypothesis 10 and for the hypothesis that E is Kong, the sound of late summer. This assumes that the sound of late summer (Earth) would be more therapeutic when administered in its own season.

The same tests of association were calculated for therapeutic response and "no risk" response categories as a function of subjects' age. When comparing the relative frequency distributions within the "better" and "no risk" categories as a function of age, no significant differences in proportions were found within either the "better" or "no risk" categories. This finding provides support for Hypothesis 11 which stated that therapeutic responsivity does not vary as a function of age. There were too few male subjects to compare responses as a function of gender.

## Musical Preferences

Hypothesis 12 stated that subjects' instrumental and musical preferences are contingent upon (the subjects') principal energetic imbalance (CF), such that instrumental and other musical preferences can be used to diagnose meridian energy imbalance. For a test of association between instrumental preferences and principal energetic imbalance (CF), instruments named by respondents were first grouped into seven instrumental family groups, including (1) keyboard, (2) plucked strings, (3) bowed strings, (4) woodwinds, (5) brass, (6) vocal, and (7) percussion (other). Responses from all 56 subjects were used for the analysis, including those for whom matched re-test data were not available for other analyses. Out of 56 subjects, there were 41 responses to the question regarding favorite musical instruments, but only 11 responses regarding least favorite musical instrument.

In order to test for significant differences in proportion of responses in each instrumental family as a function of principal energetic imbalance (CF), the number of observations in each instrumental family was converted to proportions. The null hypothesis for these analyses stated that, for any given CF, the frequency distributions in each family of instruments would not differ. Tests for significant differences in not independent proportions showed some significance for Fire CFs. For a summary of significant findings, see Table 4 (Appendix). The proportion of those Fire CFs who named keyboard (piano, .58) as their preferred instrument was not equal to the proportion of those who named brass, voice, percussion ( $z=3.0$ ,  $p<.05$ ), woodwinds, or bowed strings ( $z=1.54$ ,  $p=.12$ ) as their favorite. The proportion of those Fire CFs who preferred piano to plucked strings was

equal. The null hypothesis was rejected for Fire CF distributions. By inference, it was assumed that the proportion of people with Fire CFs preferring piano and plucked strings was greater than the proportion preferring any other instrument.

The null hypothesis was not rejected for all other CF distributions as no significant difference in proportions among instrumental groups was found. Although differences in proportions did show in gradient trends, the sample was too small for significant figures to be reliable. For those CF groups with larger total observations, patterns in preferences are more apparent. Significant findings for instrumental preferences are summarized in Table 4 (see Appendix). These findings lend only marginal support for Hypothesis 12 as only one CF group had enough respondents for meaningful data analysis.

No analysis of the association between musical style preferences and principal energetic imbalance were conducted since responses were scattered across too many musical styles, historical periods of composition, vocal, and instrumental categories for patterns to emerge from such a small sample. Thirty-three percent of all (N=49) respondents preferred "classical" music, with the remainder about equally distributed among folk, country, jazz, church, rock, rhythm & blues, vocal, popular, opera, ethnic, and new age. This is consistent with musical preferences associated with socio-economic and gender factors present in the "typical" acupuncture patient.

### Experiential Evidence

All of the practitioners observed some palpable changes in the pulse readings which they attributed to treatment of points with the musical sound



waves. These responses were generally congruent with responses expected from needling. These findings support Hypotheses 1. Comments from practitioners and patients provide information that is as enlightening as the statistical analyses and interpretations. These comments shed light on the subjective experience of both patients and practitioners. Some of the clearest comments from patients and practitioners for which "better" was the recorded pulse change are included in Table 5 (see Appendix). Spontaneous visual imagery that was either structured (had shape of recognizable objects) or unstructured (had color only) was mentioned, but only three times among all 56 patients. The colors mentioned were the colors associated via the systems of correspondence with the meridian treated. A frequently mentioned comment by practitioners for those whose treatment resulted in "better" was that pulses seemed clearer in relationship to each other. Comments from practitioners and patients for which "no change" was the recorded pulse change are included in Table 6 (see Appendix).

Comments from patients and practitioners for which "worse" was the recorded pulse change are shown in Table 7 (see Appendix). Practitioner comments for patients treated on  $I_7$  and  $V_7$  are consistent with ones expected if sedation rather than source point treatment had occurred. Comments from practitioners suggested that dramatic "worse" occurred on Fire points while other "worse" readings were not dramatic changes. Comments in regard to the "worse" pulse readings from other points indicated that subtle changes for the worse occurred. In some cases, even though the pulse was recorded as "worse," the practitioner recorded no comments worth noting.

Two other interesting findings showed in patients' comments. One item of special interest in patients' comments is that only one out of 56 patients referred to the "sound," *per se*. If patients were responding to their auditory perception of the sound wave, one would have expected more references to auditory awareness of the sound. A complementary observation is that, even those patients who experienced no pulse changes, if responding to the sensation of pressure waves against the skin, might have made comments reflecting that. There were no such comments indicating that comments related to sensory awareness seemed dependent upon interaction of meridian energy and the sine wave pattern rather than to pressure waves against the skin.

### Summary

This chapter examines many technical and interdependent details of treatment responses. Significant findings from the details cumulatively provided some support for most of the hypotheses or anticipated results. Trends in the data were generally in support of the hypotheses or anticipated results with the exception of the suggestion of an association between season of the year subjects received treatment and therapeutic response (late summer > winter,  $p > .10$ ). Other findings do support the conclusion that there were changes in meridian energy as a result of treatment ( $p = .05$ ), that there was variability in treatment response that was associated with specific points treated (yin points > yang points [ $p > .10$ ]), specific point functions (Earth > sedation [ $p < .10$ ]), and possibly principal energetic imbalances (Water > Fire [ $p < .10$ ]). Findings suggest that

musical preferences were associated with principal energetic imbalance. The reader is reminded that tentative conclusions from these findings could change when comparative data for other points or frequencies are added to interpretation of the findings. A more detailed summary of the significant findings are also interpreted and discussed in Chapter V with explicit intent to relate the findings to the overall purpose of the study.



## CHAPTER V

### SUMMARY AND DISCUSSION

#### Summary

In this pilot study, all observations in response to treatment with one of five experimental pitches were examined with a number of objectives in mind. The first was to ascertain if there were changes in yin meridian energy as a result of musical sound wave treatment which were qualitatively comparable to ones experienced by people when acupuncture points are needled. The second was to uncover any patterns in these responses which were unique to treatment with the experimental sound wave, provided empirical evidence that the system of correspondences could contemporaneously be extended to include specific pitches and specific instruments, and supported ancient Taoist prescriptions regarding the use of musical sound in therapy. The third objective was to draw inferences from statistical analysis of the observations which could reasonably be applied to the design, selection, and administration of musical interventions in the context of music psychotherapy for more effective treatment of people with psychogenic stress disorders than music therapy techniques currently provide. The fourth objective was to provide information which would inform modifications in the study design for further research of the questions and the testing of other pitches.

In the context of their regular acupuncture therapy, 56 volunteer subjects were treated on yin meridian Earth points with a tuning fork. The tuning fork was calibrated to vibrate at 329.6 Hz. Matched-pair trials were spaced 15-72 days apart and, for each trial, treated only if therapeutically indicated. Responses to

treatment were recorded by each subject's acupuncture practitioner, along with the point treated, responses to treatment if subsequent needling was necessary, season of the year treatment occurred, age, sex, principal energetic imbalance (CF), instrumental preferences, and music style preferences as described by the subjects themselves. Practitioners were asked to assign treatment responses to one of three mutually exclusive categories: "better," "no change," and "worse." Instrumental preference responses were divided into seven families of instruments including vocal, bowed strings, plucked strings, woodwinds, brass, percussion (including other), and keyboard. Musical preference responses were divided into ten categories including vocal, folk, rock, "classical," country, jazz, church, R&B, one category that included popular, opera, contemporary, ethnic, and new age; and one category, "all." Instrumental and musical style preference categories were derived by the researcher after data collection was completed.

Data analysis included tests of agreement between the test and re-test frequency distributions (N=43) for the three mutually exclusive treatment response categories. Tests of association between relative frequency distributions in each response category and CF, point treated, functions of the points treated, meridian treated, season of the year in which treatment occurred, and age were conducted. Tests of association between principal energetic imbalance (CF) and musical preferences were also conducted (N=41). Findings from the study provided empirical evidence and some support for each of the major objectives.

Use of the tuning fork on the Earth points of the yin meridians when therapeutically indicated resulted in subjective experiences among subjects and palpable pulse changes comparable to those expected when needling the same

points. The frequency distributions in response categories were generally congruent with distributions expected from needling. Trends in the results showed the highest rate of response to be "better," the next highest to be "no change," and the lowest proportion of responses in the "worse" category. Test re-test analysis resulted in statistically significant agreement ( $p=.05$ ). These findings support the hypothesis that musical sound waves comparable to the overtones (partials) produced by musical instruments interact with meridian energy.

Gradient trends in the relative frequency distributions in response categories suggested that therapeutic response to treatment was associated with treatment on specific meridians, the specific points treated, specific functions of points treated, specific principal energetic imbalance (CF) of subjects, and the season of the year in which the subject was treated. Significant findings from tests of association supported some of these gradient trends. Relative frequency distributions in response categories as a function of age, CF and season of treatment were not supported by any significant findings ( $p=.05$ ) in tests of association. Study results provided some support for a significant association between Fire principal energetic imbalances (CFs) with specific musical instrument preferences.

## Conclusions

### Significant Findings and Interpretations

Significant findings ( $p=.05$ ) from tests of agreement between the matched-pair treatments ( $N=43$ ) confirmed that the method used for testing the hypotheses was adequate. The most serious limitation of the experimental



procedure was the length of time to collect observations and the understandable discomfort practitioners felt with departing from their conventional treatment practices.

In tests of association ( $N=43$ ) between response category and point (yin meridian) treated, some statistically significant differences in relative frequency distributions between response categories were found. Fire meridian I (point  $I_7$ ) was associated with non-therapeutic changes ( $p = .05$ ). Fire meridian V ( $V_7$ ) and Wood meridian VIII ( $VIII_3$ ) were associated with statistically equal non-therapeutic and therapeutic responses. The Water meridian IV ( $IV_3$ ), Metal meridian IX ( $IX_9$ ) and the Earth meridian XII ( $XII_3$ ) were associated with "therapeutic changes" ( $p=.05$ ). Trends in the findings also suggest that there was a therapeutic effectiveness gradient among the Earth, Water, and Metal yin meridian points such that  $XIII_3$  therapeutic response  $> IV_3$  therapeutic response  $> IX_9$  therapeutic response. The tentative conclusion was that  $XII_3$  was most therapeutically reliable when treated with the sound wave. The findings for  $I_7$  are consistent with the Worsley system of acupuncture that generally avoids treatment of the Heart meridian I ( $I_7$ ) directly.

In tests of association ( $N=43$ ) between response category and function of the point treated, some statistically significant differences in relative frequency distributions between response categories were found. Tonification points and the Earth point in Earth ( $XII_3$ ) were associated with therapeutic response when treated with the experimental sound wave ( $p=.05$ ). Source points were associated with therapeutic response when treatment observations from  $I_7$  were removed from the analysis ( $p=.002$ ). The tentative conclusion is that the experimental

pitch was more therapeutic when the Earth, Metal, and Water meridians were treated; most effective when the Earth point in Earth (XII<sub>3</sub>) was treated but effective when the Water and Metal tonification points were used (IV<sub>3</sub>, IX<sub>9</sub>, XII<sub>3</sub>). Probability gradient trends suggest that comparison of therapeutic responses by function resulted in Earth > tonification > source > sedation.

Departure from 100% "better" on use of any given point could be attributed to (a) inappropriate point selection by the acupuncturist; (b) a failure in patient energetic sensitivity to appropriately choose that point function needed for energetic balancing (source point function) of meridian energy; (c) responses unique to stimulation by the specific pitch; or (d) musical sound waves in general. While all points used in this study were Earth points, and most points were source points, sedation, tonification, and probably entry point functions were tapped in the process of conducting the experiment. Inadvertent tonification, sedation, and entry functions may account for the number of "no change" and "worse" responses. It appears that, had we been testing sedation, tonification, or entry functions, intentional use of those points for those functions might have shown larger differences in frequency distributions in the three response categories. It does appear that when XII<sub>3</sub>, IV<sub>3</sub>, and IX<sub>9</sub> were used for treatment, the energetic sensitivity of subjects was supported by the sound wave. Without needling baseline data and observations from other points and other pitches available for comparison, it is difficult to ascertain whether the particular waves assisted or obstructed the discriminatory process within the energy field functions or among specific point functions.

Many studies in the contemporary music therapy research field, when looking at stress responses, have focused more on the physiological and behavioral indicators of sympathetic disturbance in the alarm phase of the general adaptation syndrome. That is to say, although not exactly equivalent, the contemporary research has focused on the yang phase, yang meridian disturbances. Findings from this study suggest that treatment of parasympathetic disturbance (yin phase, yin meridian disturbance) was more reliably therapeutic in the resistance and exhaustion stages of the general adaptation syndrome represented by the sample than was treatment of sympathetic disturbance in those stages. This study provided no observations from subjects experiencing alarm stage, sympathetic disturbances (yang phases). Because the same psychophysiological measures can be indicative of either yin phase or yang phase disturbance, one would expect both types of disturbances to be present in a study sample drawn from the population. Applying the same treatment and outcome measures to both types of disturbances could reasonably result in successful treatment of only 50% of subjects with changes in conventional psychophysiological measures not accurately assessing therapeutic outcome.

In tests of association between response category and the principal energetic imbalance (CF) of subjects treated, trends in the data suggest that people with Water CFs were associated with more therapeutic responses than were people with Fire ( $p < .10$ ), Wood ( $p < .20$ ), Metal ( $p < .20$ ) or Earth CFs. Proportion gradients suggest that Fire and Wood CFs were associated with non-therapeutic responses. Had patients been treated only on the point located on the meridian of their principal energetic imbalance (their CF meridian point),



differences could be attributed to the more successful treatment associated with treatment on points when they were located on the meridians of principal energetic imbalance (CF meridians). However, about half the patients were treated on their CF meridian and half were not. None of the Water CFs were treated on their CF Earth point. Differences seem, then, to be a possible association with principal energetic imbalance (CF). In addition, for eight subjects, the CF was unknown. Distribution of those observations into their respective CF groups could easily have resulted in analyses outcome that clearly confirmed or disconfirmed gradient trends. Tentative conclusions from the findings are that the therapeutic response may vary as a function of principal energetic imbalance (CF). These findings were not anticipated and reasons for these findings are, at this time, generally elusive to me. Findings do support the idea that Water CF people may be those more sensitive to changes initiated by the frequencies of musical sound *versus* the gestalt of a musical event. Analysis of more observations from each point, with half treated on CF meridians and half treated on meridians other than CF meridians, could confirm or disconfirm the suggestion of an association.

Tests of association between therapeutic response and age showed no significant differences. A proportion gradient was not confirmed. This finding may be more attributable to an insufficient number of observations than to the absence of an association. Distribution of three unknown age observations into respective response categories might have directed a gradient. Examination of the available data in light of comparable data from other tests of association suggests that the tentative conclusion of no significant differences may be a real absence of

association. If so, these findings are in sharp contrast to age-related responses to the perceptual experience of a whole musical event which are influenced by preferences which do vary as a function of several factors, including age.

Tests of association between therapeutic response and season of the year in which the experimental treatment was received by a subject did show some suggestion of differences in the relative frequency distribution between response categories. Subjects tested in the late summer were associated with a higher proportion of therapeutic responses than were people who received treatment in the winter ( $p > .10$ ) or summer ( $p < .20$ ). There were so few patients tested and re-tested in two seasons that analysis of test/re-test data by season was not necessary or possible. Comparison to spring testing was not meaningful since only one patient was tested in the spring. These findings do suggest that response to sound waves may be frequency/season-specific rather than just frequency/meridian/point-specific as anticipated. This finding does support the Nei Ching statement that each frequency circulates for 72 days and the practice of using certain modes in specific seasons to maintain phase harmony. Reduction to only energetic seasons (evolutionary phases) in patients may be an erroneous reduction. A more appropriate interpretation may be that a specific pitch or key is more energetically interactive in a specific calendar season rather than in the "body seasons."

Because diagnosis and treatment are associated with seasonal exacerbation and regression of symptoms, treatment, diagnosis and calendar time are not truly independent from each other. The absence of a large enough sample in each season for test/re-test matched-pairs is a serious limitation of the study. The tentative conclusion, however, is that therapeutic effectiveness is associated with

season and that the effectiveness of a pitch may be seasonally specific. In this case, E = Kong = the sound of late summer (Earth) does receive some tentative support. The association of pitch to an energetic phase seems to rest on a temporal relationship and this relationship seems to reverberate through the whole systems of correspondence from micro-time to macro-time. I was aware from my extensive research of the Nei Ching that the ancient medical music therapists expected responsivity to a particular pitch to vary as a function of season. From my Western, contemporaneous skeptical perspective, the results from this study supporting those ancient findings were a complete surprise. I can offer no further explanation for the findings.

Tests of association between instrumental preferences and subjects' principal energetic imbalance (CF) showed some significant differences. This was surprising, given the small sample in each CF group and the large number of instrumental groups. People with principal energetic imbalances in the Fire phase preferred keyboard and plucked strings over all other instruments ( $p=.05$ ). The tentative conclusion from these findings is that instrumental preference may be associated with specific energetic imbalances such that instrumental preferences can be used to diagnose meridian energy imbalances. The timbre of the preferred instruments and their characteristic method of sound production were associated with a particular phase, congruent both in concept and descriptively with comparable findings in the ancient Taoist literature. These findings suggest that particular timbres (with specific temporal sequencing of generated partials) can be used to treat specific phase imbalances. There were insufficient data to draw any conclusions with regard to other CF groups or to musical style preferences.



Findings from the study support the conclusion that sound waves do interact with meridian energy in ways that are comparable to needling effects. Practitioner comments suggest that there are some subtle and very positive differences in response. Subjects generally made positive statements when comparing the feeling states or sensations associated with the sound wave to needling sensations or feeling states. The dynamics of response patterns with this experimental pitch were congruent with those one would expect if E (329.6 Hz) were the pitch contemporaneously associated with the Earth phase. These findings are supportive of the hypothesis that E (329.6 Hz), the fifth partial from C<sub>2</sub> (the fundamental) is Kong, and Kong is the sound belonging to the Earth element yin meridian. These findings support the conclusion that effective therapy (tonification) was accomplished with sound waves via the K'o cycle and the Shen cycle and that source points with the exception of I<sub>7</sub> and V<sub>7</sub> may be safely and effectively treated with this sound wave.

Findings support the conclusion that reliable therapeutic effectiveness of the experimental pitch may be specific to yin meridians in only the yin phases (Earth, Metal, Water). People with yin phase principal energetic imbalances, especially Water CFs may be more therapeutically responsive to musical sound waves than people with principal energetic imbalances in other phases. Effectiveness of the experimental frequency is associated with specific points, tonification functions of points, and possibly the season of the year in which treatment occurred. Findings suggest an association between principal energetic imbalance and instrumental preferences. With the exception of Shen cycle function activated with sound waves, all of these findings and interpretations are

congruent with ancient Taoist prescriptions for use of music in therapy and with ancient Taoist medical theory. Findings from the study add contemporary musical elements to the system of correspondences.

### Methodological Limitations

Throughout the study, the most serious limitations were the absence of (a) comparable observations from acupuncture needling, (b) comparable observations from other points on the same meridians with the same pitch, (c) comparable observations from the same points with another pitch, and (d) absence of inter-rater reliability tests. Comparisons to findings from those observations are important in discerning the treatment effects that are unique to E (329.6 Hz) and in differentiating between meridian and point effects. Findings from this study, while concluded to be attributable to E (329.6 Hz), may in fact belong to any sound wave of any pitch.

The second most serious limitation of the study was the relatively small number of observations in each response category because of sample size and unrecorded observations. Lack of statistically significant differences were not necessarily indicative of absence of difference, but could be attributed to sample sizes too small for differences to be detected. Since significant findings are probably very real ones in small samples, the presence of a number of significant differences in this study strongly suggests that finer and perhaps more reliable pattern discriminations could result from larger sample sizes.

The third most serious limitation of the study was the length of time to collect data because of the clinical setting and ambivalence of the data collectors in administering the experimental treatment.

### Implications

#### Clinical Application: Music Psychotherapy Treatment and Prevention of Psychogenic Stress Disorders

Findings from the study suggest some guidelines for clinical application which increase the probability of predictable effects from musical intervention. These fall into the three areas of (a) diagnosis, (b) design of musical interventions, and (c) selection of appropriate clients. Limited findings from the study suggest the association of specific instrumental preferences with at least one principal energetic phase imbalance. These findings are consistent with ancient Taoist references which include, in the systems of correspondence, a specific instrumental timbre associated with the yin aspect of each energetic phase. Findings from this study suggest that instrumental preferences may be included in the systems of correspondence and used for diagnosis. These findings, then, also offer some guidance in the design of musical interventions relative to instrumentation.

Unless it is assumed that pitch is not as critical as musical sound *per se*, clinical application of the findings requires re-construction of E (329.6 Hz) into a whole musical event. This reconstruction is limited in generalization to the musical keys of E major and minor (and the related keys of C major and minor). Although effective in all seasons, musical interventions in the major and minor



keys of E (or C) may be more effective when administered in the late summer than in any other season. Although the reasons for an association of treatment effectiveness with season of administration is elusive to me at this time, I think it is worth observing in clinical practice.

Findings from the study are more easily generalized to clinical application in the area of appropriate client selection. Mixed or apparent counter-therapeutic results from musical intervention suggest that some interventions are sedating energy when tonification is needed and *vice versa*. Findings suggest that in order to prevent inadvertent and counter-therapeutic sedation or entry point action, musical interventions in the keys of E major/minor (C major/minor), should be provided primarily to those people needing tonification or preventative support (source point treatment) of only meridians IV (Water), IX (Metal), or XII (Earth) phases, the yin aspects of the yin phases. Findings suggest that musical intervention in the keys of E major/minor (C major/minor) may be most appropriate for people whose principal energetic imbalance is in the Water phase.

Findings suggest that musical sound wave treatment of people with parasympathetic disturbance symptoms in resistance or exhaustion stages of the general adaptation syndrome may be more therapeutically reliable than treatment of people in any stage of sympathetic disorders. Patterns of response suggest that people with parasympathetic disturbances or other disorders associated with yin phase (Water, Metal, Earth) principal energetic imbalances are the people most likely to benefit from music psychotherapy which utilizes the systems of correspondence for designing both musical and verbal interventions addressed towards catalyzing energetic change.

While pulse diagnosis is necessary for diagnosis of phase or meridian imbalance whether temporary or chronic, symptoms are used to confirm the diagnoses. The following symptom constellations provide some examples of disorders and symptoms associated with disturbances resulting from chronic or temporary energetic imbalances in each of the yin phases (compiled from DSM-III-R, 1987; Klate, 1980; Larre, 1986; Lu, 1978; Porkert, 1983, 1974; Seem, 1987):

Earth phase somatic symptoms might include increased gastric activity, ulcer, digestive and malabsorption disorders, slow metabolism; disturbances in the sensation of touch, motor coordination, kinesiology; hypersensitivity to humidity. Behavioral, emotional or cognitive symptoms might include eating disorders, distortion of body image, disturbances in receptivity to or expression of nurturance, sympathy, empathy, concern or thoughtfulness; nightmares, hypochondriasis, chronic worry, disturbances in communication between self and others as well as intrapsychically and disturbances in relationships to nurturing figures. Symptoms are likely to be exacerbated or significantly regressed in the late summer.

Metal phase somatic symptoms might include elimination disorders such as diarrhea or constipation, acne and other skin disorders, colitis; asthma and other respiration disturbances, increased susceptibility to pathogens and other immune disorders, disturbances in sense of smell, hypersensitivity to dryness. Behavioral, emotional or cognitive symptoms might include preoccupation with form or structure, difficulty completing tasks, rigidity of thought, emotionally withholding; chronic feelings of sadness or grief, obsessive compulsive disorders, oppositional disorders, disturbances in relationships to authority figures and external authority

in general. Symptoms are likely to be exacerbated or significantly regressed in the autumn.

Water phase somatic symptoms might include edema, urinary disorders, low blood pressure, fatigue states, low-back pain, endocrine secretion disturbance, disturbance in regulation of anti-inflammatory hormones, disturbances in mobilization of genetic codes and messengers, loss of hearing, hypersensitivity to cold and sound. Behavioral, emotional or cognitive symptoms might include "workaholism," excessive need for privacy, phobias, chronic fear, anxiety, depressed or serious mood, difficulty concentrating, poor listening skills, loss of memory, adjustment reaction, post-traumatic stress disorder, attention disorders and disturbances of relationship to will. Symptoms are likely to be exacerbated or significantly regressed in the winter.

Findings from this study suggest that clients with these or related symptoms might receive more therapeutic benefit from music interventions in the musical keys of E major/minor (C major/minor) than from music interventions in other keys. In clinical application, one would expect to see a higher incidence of clinical indicators that meridian energy was directly affected (tonified) by the musical intervention.

By logical extension, I would expect music in the keys of E major/minor (and C major/minor) to provide facilitative assistance in prevention of stress disorders associated with situational or chronic excessive energetic demand on these yin phases (Water, Metal, Earth). One example of application for prevention is in work with people who have recently experienced or chronically experience events which would normally be expected to provoke high levels of



fear (Water), grief (Metal), or empathic involvement with others (Earth). Failure to successfully modulate the energetic assault to these phases from the excessive experience of these emotions in a timely way can result in development of chronic phase imbalance and resulting symptoms. This example calls to mind some occupational groups as well as a long list of possible traumatic events. Another example of application for prevention is in work with population groups known to experience difficulty with central themes associated with these yin phases. These might include "normal" (American) women, teenagers and overweight individuals in regard to issues of body image (Earth), people experiencing crises in self-worth or bereavement groups (Metal), or people in the throes of situations such as major life changes demanding increased adaptive capacities (Water). A third example of application for prevention is in work with special interest groups known to experience need for support of these energetic phases during times of concentration of effort in regard to central themes associated with these phases. These might include values clarification groups (Metal), people in the *incubation* stage of the creative process (Water), or parenting groups for people with young children (Earth).

The use of musical interventions, tonification of the underlying energetic imbalances, and prevention of energetic depletion are compatible with the overall treatment goals of *most* current psychotherapies whether individual, group, family, time-limited or extensive. The use of these treatment strategies are compatible with *most*, but not all, current psychotherapeutic and educational techniques. Explication of the relative compatibility with specific theoretical systems, specific techniques, methods for integrating musical interventions to parallel or augment

verbal interventions, and applied techniques of music psychotherapy are beyond the scope of this discussion.

Findings from this study suggest that musical intervention in the keys of E major/minor (C major/minor) may not be therapeutically reliable and therefore not appropriate for people with principal energetic imbalances in the Fire or Wood phases (sympathetic disturbances). Results suggested the possibility that musical sound waves (or the frequency tested in this study) may interfere with Fire or Wood CF (principal energetic imbalance), people's capacity to discriminate and select the desirable therapeutic function which assists energetic balancing. This is not incongruent with the Fire meridians having most involvement in discernment in general and in auditory discrimination. Future research and clinical observation may shed light on whether a different pitch or the related keys of C major/minor would be more therapeutically reliable with yang phase (sympathetic) disturbances in the alarm, resistance or exhaustion stages of the general adaptation syndrome or with sedation of the yin aspect of the Earth phase.

If one note elicits such a variety of responses from people when the measures of change are so fundamental, it is difficult to suggest that we could find a *randomly* selected group of people from whom there would be consistency in conventional psycho-physiological measures of response to musical selections ordinarily used in music therapy research. Yet, in clinical practice, we do find music to which individuals respond therapeutically. Lack of "positive" change in conventional psycho-physiological measures taken concurrent with exposure to musical stimuli are probably not conclusive findings as to the therapeutic value of

a musical intervention *per se*. Physiological measures or reported symptoms from individuals as a result of one treatment session may or may not reflect return to dynamic equilibrium. Therapeutic value of the psychotherapeutic process and the use of musical interventions are more apparent over time.

### Future Research

One purpose of the study was to provide a pilot project with which to inform the research effort towards continued testing of the study hypotheses. A number of recommended changes have come from this study, including the following:

It is recommended that testing of frequency #1 (E, 329.6 Hz) continue until there are at least 20 matched-pair trials for each point.

It is recommended that an equal number of baseline needling results tested using the same point selection criteria be gathered for comparison purposes.

It is recommended that an equal number of sound wave stimulations with at least one other frequency on the same points be tested for comparison purposes.

It is recommended that an equal number of sound wave stimulations with at least one other frequency on specific points congruent with K'o, Shen, violation and sedation treatment expectations for that frequency be tested for comparison purposes.



It is recommended that an equal number of sound wave stimulations with E (329.6 Hz) be tested on other command points (major therapeutic points on each meridian) for comparison purposes.

It is recommended that the re-test trial not be limited in administration by time. Season associated treatment effects can be adequately discerned through statistical analysis of test-retest data organized by season.

It is recommended that information about instrument and musical style preferences be gathered outside the experimental procedure treatment session through distribution of questionnaires to acupuncture patients.

Intentional testing of this frequency on  $V_7$  and  $VIII_3$  for sedation function and on  $IV_3$  and  $IX_9$  for tonification function may assist in clarifying the effectiveness of this pitch for sedation and for tonification. Baseline needling data and at least one comparison frequency would assist in interpretation of results.

It is recommended that the research hypotheses be re-written for more technical precision and reviewed for continued necessity as other pitches/points are tested. They were primarily awkward reflecting the uncertainty of where one might begin this investigation.

Some aspects of this study probably are best served by retaining design elements. It is *not* recommended that color, odor, sound, or emotion be used in the treatment response categories. Pulse diagnosis and perception of patient's color, the sound of the voice, odor and predominant emotion experienced by the patient (but perceived by the practitioner) are all essential ingredients in diagnosis. Pulse diagnosis is less likely to be influenced by practitioner bias, insensitivity or projection than are the other diagnostic variables. Pulse diagnosis

is more likely to have and retain higher session-to-session or interpractitioner reliability than any of the other measures. It is recommended that color, sound, odor, and emotion be retained on the data recording form and that this information be gathered in future studies. In this study, changes in all of the pieces of information were not always recorded. Where present, it was apparently more useful to practitioners for confirming treatment outcome than for defining the quality of treatment outcome.

It is also *not* recommended that response categories be put on either an ordinal scale or interval scale. The primary reasons for considering such a change are (a) to increase the range of statistical procedures, (b) to increase the sensitivity of outcome measures, and (c) to improve the capacity for discerning subtleties in response patterns. I don't think it is necessary or desirable to do so. There are adequately powerful statistical tests for evaluating observations organized on a nominal scale if there are a sufficient number of observations. These analytic techniques result in findings which are adequate for comparing treatment outcome. At this stage of the investigatory process, finer tuning of treatment outcome would probably confound analysis of treatment outcome. Perception of pulse changes (pulse diagnosis) emanates from a sensory experience which includes sensitivity to temporal and spatial characteristics of the pulse. Processing of that information in light of a patient's total energetic picture is a complex cognitive event which includes a weighted evaluation of both qualitative and quantitative aspects of those temporal and spatial characteristics. The effort to construct and use a more sensitive scale by practitioners for measuring treatment outcome is more likely to deconstruct the total picture necessary for

defining treatment outcome. The end result would probably be a less sensitive (or useless) scale with very low inter-rater reliability. The more "gross" the response categories are, the more reliable findings from comparison studies of needling, different pitches, different points, or whole musical events will remain. The analytical process which continuously subdivides the whole into smaller parts is the antithesis of both Oriental medical logic and theory and the processes by which patterns are perceived. Nominal scales themselves, while certainly not cognitively sophisticated, work for the purpose of this investigation. Use of ordinal or interval scales for describing too many details of treatment outcome carry the probability of obscuring inductive links for the basic building-block patterns of treatment outcome. As a practical matter, practitioners need the most familiar procedure possible to ease their participation. Practitioners reported the response categories as adequate.

There is some justifiable interest in discerning subtle or possibly not so subtle differences between (a) needling effects and musical sound effects on the pulses; (b) between and among pulse differences from use of different points or pitches; or even (c) duration of treatment effects. Changing scales upon which to describe treatment outcome is one strategy not likely to be an effective possibility. Another possibility is to engage the use of a recent technological development which, via electrodes, digitizes the pulses. Print-outs of the pulse digitalization holds promise of providing data suitable for quantifying and spatially describing pulse change differences unique to sound wave interaction. Correlational studies of subjective experience, practitioner evaluation of pulses, and evaluation of patterns in the print-out could be enlightening.



Practitioners reported the procedure as easy to conduct and not time consuming. Although practitioners also reported the data recording form as adequate, some information was not recorded on the forms, rendering some observations unusable. Practitioners also reported that patients were cooperative and not anxious about the procedure. The greatest difficulty practitioners experienced was remembering to do the experimental procedure. This probably reflected (a) some lack of motivation or ambivalence, (b) the depth of concern practitioners feel for clients who are suffering, (c) some cognitive dissonance, and (d) some professional concerns. Letters from practitioners indicated intellectual interest and support for the research. However, those practitioners who did participate for some time reported that departure from the known procedure with which they were comfortable was difficult when they were in the moment with a person in pain or crisis. These two factors rendered gathering of data a very slow process. In addition, most practitioners were surprised by the clinical results. Practitioners experienced the range of emotional and behavioral response to new and challenging information that one would expect. For a few practitioners, responses included withdrawal from the study. Others withdrew as a function of the passage of time and lack of feedback as the data collection process lengthened past everyone's expectations.

The use of the tuning fork in this study was exclusively for the purpose of gathering information regarding the interaction of musical sound waves and meridian energy. Despite my explanations of the purpose of the study to practitioners who were familiar with references to musical sound in Oriental medical theory and literature, to colleagues, and to other interested people, a

number of people in discussions assumed I would use the information gathered to guide me in concrete operational use of the tuning fork on acupuncture points in my own clinical practice. While this was an erroneous assumption, it is possible that some participating practitioners also made that unarticulated and erroneous assumption. Given the observed effectiveness of the tuning fork, it would be logical for practitioners to feel professional concerns as they knew me to be someone without acupuncture practitioner training. Such possible concerns may also have contributed to practitioners' difficulty in remembering to carry out the procedure.

Obviously, increasing the motivation of participating practitioners to assure follow-through is of utmost importance. Sharing of preliminary findings, while perhaps increasing practitioner bias, may increase the degree to which practitioners can feel comfortable with a minor departure from "routine" clinical procedure. Decreasing the number of participating practitioners to include only those highly motivated individuals might also assure follow-through. Another solution to the data collection problem may be to enlist the assistance of more Worsley-trained practitioners and to replicate the method used. A third possibility is to enlist the aid of patients for sound wave treatment only but outside the regularly scheduled treatment and conducted by the patient's regular practitioner. In a large practice, the necessary observations could be made in a shorter time, but by one or two practitioners. This latter solution also offers more possibility of determining inter-rater reliability.

The last recommendation is that continuation of the study be conducted. Integrating the recommendations into analysis of observations offers the potential of clarifying initial findings and answering questions raised by this study.

A very important part of the study was to test the interpretive hypotheses regarding the effects of musical sound for congruence with findings in the Nei Ching. In the initial phases of this investigatory work, I was first discouraged and then challenged by the fact that acupuncture practitioners and contemporary scholars of Oriental medical theory, history, and music history had neither uncovered the pitch equivalent to Kong or each of the five phases congruent with K'o cycle prescriptions, nor provided enough information from which I could derive those easily. I did my own investigation of the Nei Ching and a complex process of decoding mathematical, numerical, and musical references. I interpreted through to a system of pure-tone pitch correspondences with one specific pitch for each of the five phases. Testing the one I believed to be equivalent to Kong on specific points theoretically expected to be therapeutically responsive if my hypotheses were correct was the logical place to begin the investigation. Findings from this study are extremely encouraging. Each of the other pitches are related mathematically, musically, and theoretically to 329.6 Hz (E) and to Kong. Findings that support E (329.6 Hz) as Kong indirectly provide some support for the whole system of pitch correspondences I've hypothesized as the musical equivalents of the ancient musical references in the systems of correspondence.

Findings from the study offer substantial enough collation of information and focus to inspire a cascade of questions and possible strategies for further



exploring the findings and extending the body of knowledge gained from this study. Some aspects of the findings could be explored in acupuncture, psychotherapeutic, medical, music therapy or educational settings where whole musical events could be used. Continued investigation, for example, of keys, instrumental preferences, seasonal reactivity and selection of appropriate clients would of course require design elements necessary to assure that common operational definitions as well as diagnostic and outcome criteria which are conceptually *compatible* with those in this study be used in order to add to the development of this model.

With the aid of synthesizers and computerized keyboards which print out musical notation from improvised music, new possibilities for extending the system of correspondences to include musical elements other than pitch exist. With the aid of these electronic and computerized tools, it is possible for music therapy researchers to hold one musical element constant to obtain treatment response measures as a function of that element. Using the same whole musical event to keep all elements constant but key, for example, treatment response to a particular piece of music as a function of different keys could be measured. Using similar techniques, it is possible to isolate rhythmical patterns, tempo, timbre, specific harmonic patterns, aspects of melody, and even musical style. While this approach is different from the approach generally used in music therapy, it is a strategy that could help describe the role each musical element plays in the whole response no matter how the treatment outcome were defined or measured. Such an approach would also contribute to a rationale for selection of musical

interventions that were more therapeutically reliable. Practical applications from the study may be of value currently to music therapists in their clinical work.

### Related Fields

Practical applications from the study may be of special value to acupuncture practitioners. Findings from the study offer the possibility of adding tuning forks to the repertoire of techniques available for contacting meridian energy. At this time, doing so appears to be clarifying, gentle, and free of noxious sensation. This could be of particular value to needle sensitive people and to children. How useful this technique proves to be awaits further clinical application and research that tests other pitches. There is some suggestion that the use of music in the treatment room may confound diagnosis and needling effects.

Implications of the findings from this work are of particular importance to psychotherapists, medical practitioners, and educators. While some specific findings can be applied by non-musicians in their psychotherapeutic, medical, or educational settings, my hope is that the study has illustrated the value of cross-cultural and interdisciplinary studies in the development of our own training, and in our respective practices. The content, process, goals, and findings of this work are in sharp contrast to the prevailing Western model. Both the experimental design and the findings from this study brought ancient and cross-cultural ways of conceptualizing etiology, the disease process, the healing process, treatment goals, treatment, and evaluation of treatment outcome out of the past into the contemporary interdisciplinary dialogue. Both the ancient and contemporary

bodies of knowledge and methods of inquiry informed the other in the search for ways of modifying the processes with which we treat stress disorders.

Psychotherapists, medical practitioners, and educators are generally aware of the complicated relationship of mind/body/environment. They are generally aware of the relationship between psychogenic stress and functional disorders—physical and mental. Professional training has obscured perception of the continuum along which symptom complexes can present and has clouded evaluation of conditions which warrant what type of clinical intervention. In current practice, most psychotherapists focus their work primarily on modifying the past, present or future relationship between mind and (*social*) environment. Medical practitioners focus primarily on modifying function of one part of the body. Educators focus primarily on modifying one part of the mind. While perhaps somewhat exaggerated for illustrative purposes, we have failed ourselves by training away our capacity to honor and truly work at the interface of the inseparable mind/body/environment relationship.

The collective dissatisfaction with the prevailing model is no more apparent than in the growing of a new psychology of women; in the emerging fields of psycho-neuroimmunology; in the professionalization of body therapies; in the increased emphases among school psychologists and adjustment counselors to institute self-help groups and referrals to family therapy. Despite emerging shifts in consciousness, the majority of people still receive mental health, medical services and special education services dominated by provision of (a) heroic measures for management or suppression of symptoms and (b) technologically sophisticated, expensive *diagnosis* of stress disorders already in the exhaustion



stage of disease progression. In order to provide *truly curative and preventative* care, we need to recognize the need early, start intervention sooner, and start intervention in whatever settings are practical. Recognition of that therapeutic need is perhaps equally as important as developing techniques to meet the need. Findings from this study—although perhaps more importantly, the frame of reference from which the findings were sought—can help each of us to more comfortably look differently at the deeper and more subtle indicators of distress our clients, patients and students experience. In doing so, therapeutic modification of the mind/body/environment relationship has already begun. It is my hope that clinical and educational application of findings from this study contribute to the revitalization of ancient therapies, to knowledge in emerging fields, and to the continued development of a new consciousness.

## APPENDIX A

### TABLES

Table 1

Summary of Significant Differences Between Proportions  
in Response Categories for Individual Points

n	Point	Significant Differences	z value ( $\geq 1.96$ )	p
5	I <sub>7</sub>	worse (.60) > no change (0)	2.14	<.05
6	IV <sub>3</sub>	better (.83) > worse (0) no risk (1.00) > worse (0)	4.88 >4.88	<.05 <.05
9	V <sub>7</sub>	none	--	--
6	VIII <sub>3</sub>	no risk (1.0) > worse (0)	2.45	
3	IX <sub>9</sub>	better (.67) > worse (0) no risk (1.0) > worse (0)	2.03 >2.03	<.05 <.05
14	XII <sub>3</sub>	better (.79) > worse (0) no risk (1.0) > worse (0)	6.14 >6.14	<.05 <.05



Table 2

## Summary of Significant Differences Between Proportions in Response

## Categories for Points with Observations Grouped by Point Function

n	Point Function	Significant Differences	z value ( $\geq 1.96$ )	p
9	Tonification IV <sub>3</sub> , IX <sub>9</sub>	no risk (1.00) > worse (0) better (.78) > worse (0)	>4.92 4.92	<.05 <.05
20	Sedation I <sub>7</sub> , V <sub>7</sub> , VIII <sub>3</sub>	no significant differences	--	--
38	Source (excluding I <sub>7</sub> ) IX <sub>9</sub> , IV <sub>3</sub> , V <sub>7</sub> , VIII <sub>3</sub> , XII <sub>3</sub>	better (.71) > worse (.03) no risk (.97) > worse (.03)	3.0 >3.0	.002 <.05
14	Earth in Earth (entry) XII <sub>3</sub>	better (.79) > worse (0) no risk (1.0) > worse (0)	6.14 >6.14	<.05 <.05
43	Entry/Earth Points (all points)	no risk (.91) > worse (.09)	1.90	.057

Table 3

Summary of Significant Differences Between Proportions in Response Categories  
with Observations Grouped by CF (Principal Energetic Imbalance)

CF Proportion Differences	$t_{\text{obs}}$	df	p
(Better) Therapeutic			
Water (1.0) > Fire (.44)	1.93	11	<.10
Water (1.0) > Wood (.50)	1.75	10	<.20
			(almost .10)
Water (1.0) > Metal (.67)	1.42	8	<.20
Earth (.77) > Fire (.44)	1.43	16	<.20
No-Risk			
Earth (1.0) > Fire (.67)	1.83	16	<.10
Metal (1.0) > Fire (.67)	1.57	13	<.20

Table 4

Summary of Significant Differences Between Proportions in  
Instrumental Groups with Preferences Grouped by CF  
(Principal Energetic Imbalance)

CF	Significant Differences Favorite Instrument	z value ( $\geq 1.96$ )	p
Fire n = 12	keyboard (.58) > bowed strings (.04)	1.54	.12
	woodwinds (.04)	1.54	.12
	brass (0)	3.0	<.05
	vocal (0)	3.0	<.05
	percussions (other) (0)	3.0	<.05
	keyboard (.58) = plucked strings (.25)		



Table 5

## Comments from Patients and Practitioners for Which "Better"

## Was the Recorded Pulse Change in Response to Treatment

CF	Point Treated	Season Treated	Patient Comment	Practitioner Comment
Wood	I <sub>7</sub>	Fall	1. I can feel tingling in palm similar to needling.... 2. Feel whole hand relaxing...	1. -- 2. Right side of pulse came up more than left...
Water	IV <sub>3</sub>	Winter	1. Feels real warm. I like it... 2. I'm much more receptive to this...feels good, it's gentle, not overwhelming like needles...	1. Big pulse change - bigger pulse change than with needles... 2. Again, big pulse change better than needles...
Fire	V <sub>7</sub>	Winter	1. -- 2. --	1. She could feel it down to V <sub>9</sub> ...she was sure tuning fork was touching feeling was so strong... 2. --
Metal	VIII <sub>3</sub>	Fall	1. Feel more connected...subtle...feel real happy... 2. --	1. Very good pulse change... 2. --
Metal	IX <sub>9</sub>	Winter	1. Feels like soothing echo...going into lungs...very centering 2. --	1. -- 2. --
Earth	XII <sub>3</sub>	Spring	1. I feel more energy even than when needled... 2. Everything feels cleared...	1. Pulses clearer...more energy... 2. Seems very sensitive to sound...Very positive reaction...will continue to use at end of treatments...had a wonderful spontaneous vision of a pyramid connecting all her meridians.

Table 6

Comments from Patients and Practitioners for Which "No Change"  
Was the Recorded Pulse Change in Response to Treatment

CF	Point Treated	Season Treated	Patient Comment	Practitioner Comment
--	I <sub>7</sub>	--	--	--
	IV <sub>3</sub>	Winter	1. Don't feel anything 2. --	1. One of few with no change... 2. No change...
Fire	V <sub>7</sub>	Summer	1. That's interesting...	1. I don't note any change at all...
Wood	VIII <sub>3</sub>	Summer	1. It gives me goose bumps...my chiroprator does this sometimes. 2. --	1. No discernible change... 2. No change...
Metal	IX <sub>9</sub>	Fall	1. --	1. I was expecting more change, especially since it is fall but there was practically none.
Earth	XII <sub>3</sub>	Fall	1. --	1. One of the few people where I have felt no change...

Table 7

Comments from Patients and Practitioners for Which "Worse"

Was the Recorded Pulse Change in Response to Treatment

CF	Point Treated	Season Treated	Patient Comment		Practitioner Comment
Fire	I <sub>7</sub>	1. Summer	1. I don't like the sound...		1. Everything contracted, pulses become tight and deep, she became slightly irritable and paler...
		2. Late Summer	2. What's that pitch? It sounds different from what I remember but I don't like it.		2. Not so strong a reaction as last time, but pulses still contracted and pulled in...
Fire	I <sub>7</sub>	Fall	1. I feel a tingling in my arm...		1. Pulses down, a little harder, maybe not a good point to use...
--	IV <sub>3</sub>	--	--		--
Fire	V <sub>7</sub>	Winter	1.	--	1. All pulses became tight and Fire and Water completely collapsed...
--	VIII <sub>3</sub>	--	--		--
--	IX <sub>9</sub>	--	--		--
Earth	XII <sub>3</sub>	Fall	1.	--	1. Pulses slightly down over all...



## APPENDIX B

### FIGURES

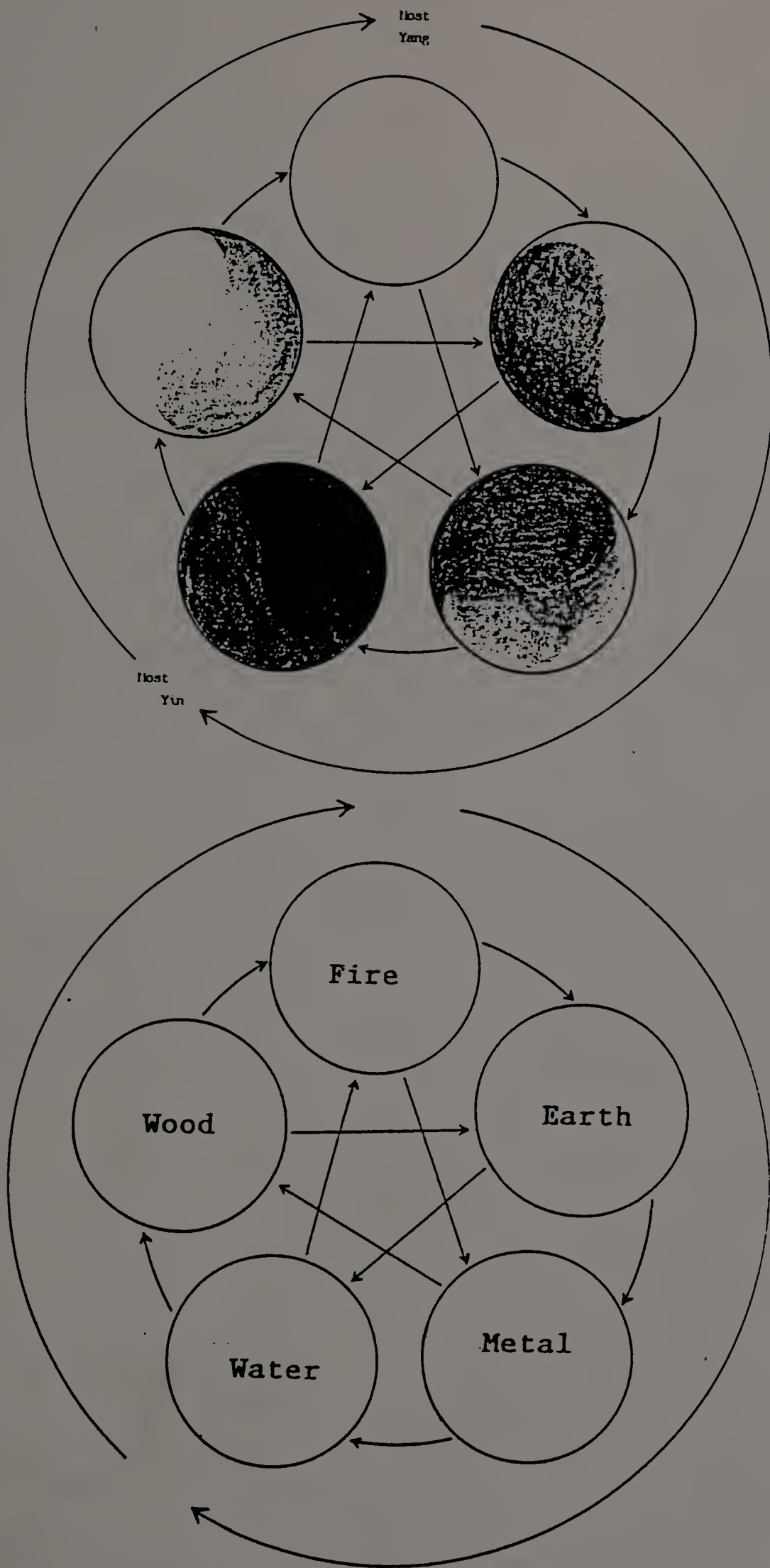
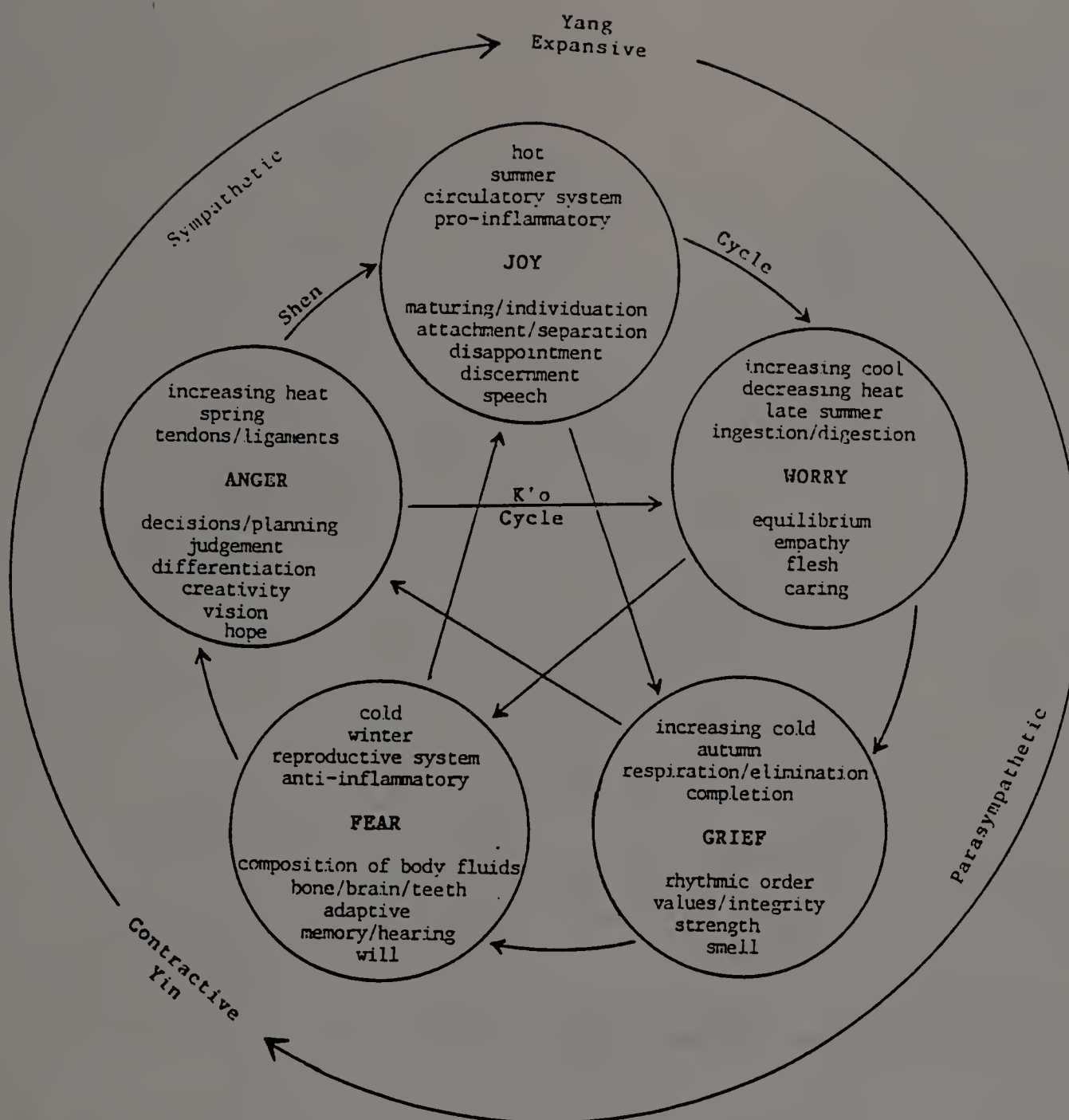


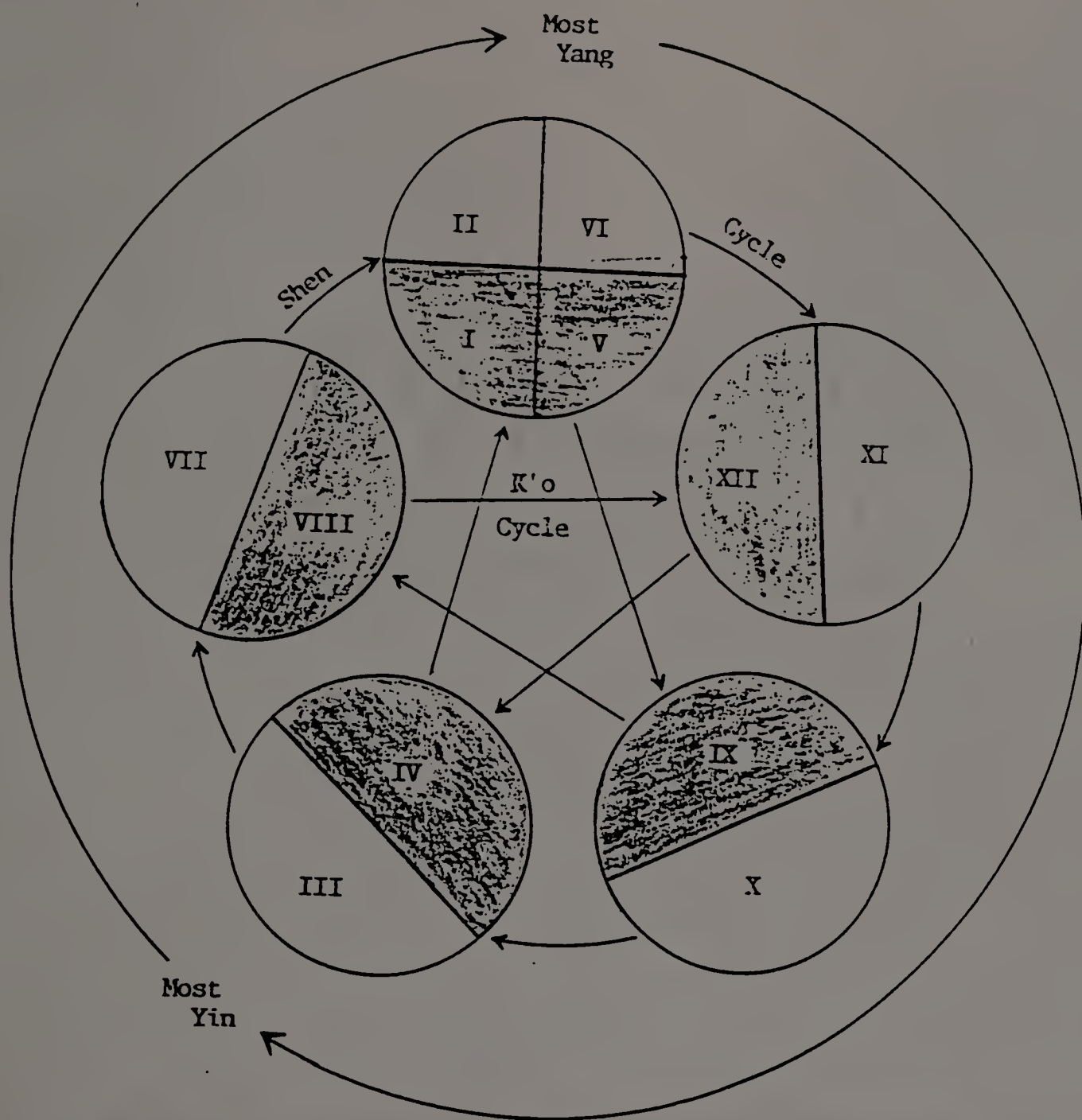
Figure 1. Yin/yang and five phases of transformation.



INCREASING YANG	INCREASING YIN
Sympathetic Disturbance insomnia, irritability inhibition of parasympathetic cardiac neuroses migraines/rheumatoid arthritis agitated activity/rapid heart hypertension stepped-up metabolism increased blood pressure hyperthyroidism dilation of peripheral blood vessels	Parasympathetic Disturbance fatigue states increased gastric activity ulcer/decreased activity bronchial asthma vegetative retreat diarrhea/malabsorption slow metabolism low blood pressure hypothyroidism constipation/colitis

Figure 2. Somatic disorders associated with yin/yang disturbances.





Yin		Yang	
I	Heart	II	Small Intestine
V	Circulation/Sex	VI	Three Heater
XII	Spleen/Pancreas	XI	Stomach
IX	Lungs	X	Colon
IV	Kidneys	III	Bladder
VIII	Liver	VII	Gall Bladder

XIII Conception Vessel

XIV Governor Vessel

Figure 3. Twelve major meridians and relationship to each phase.

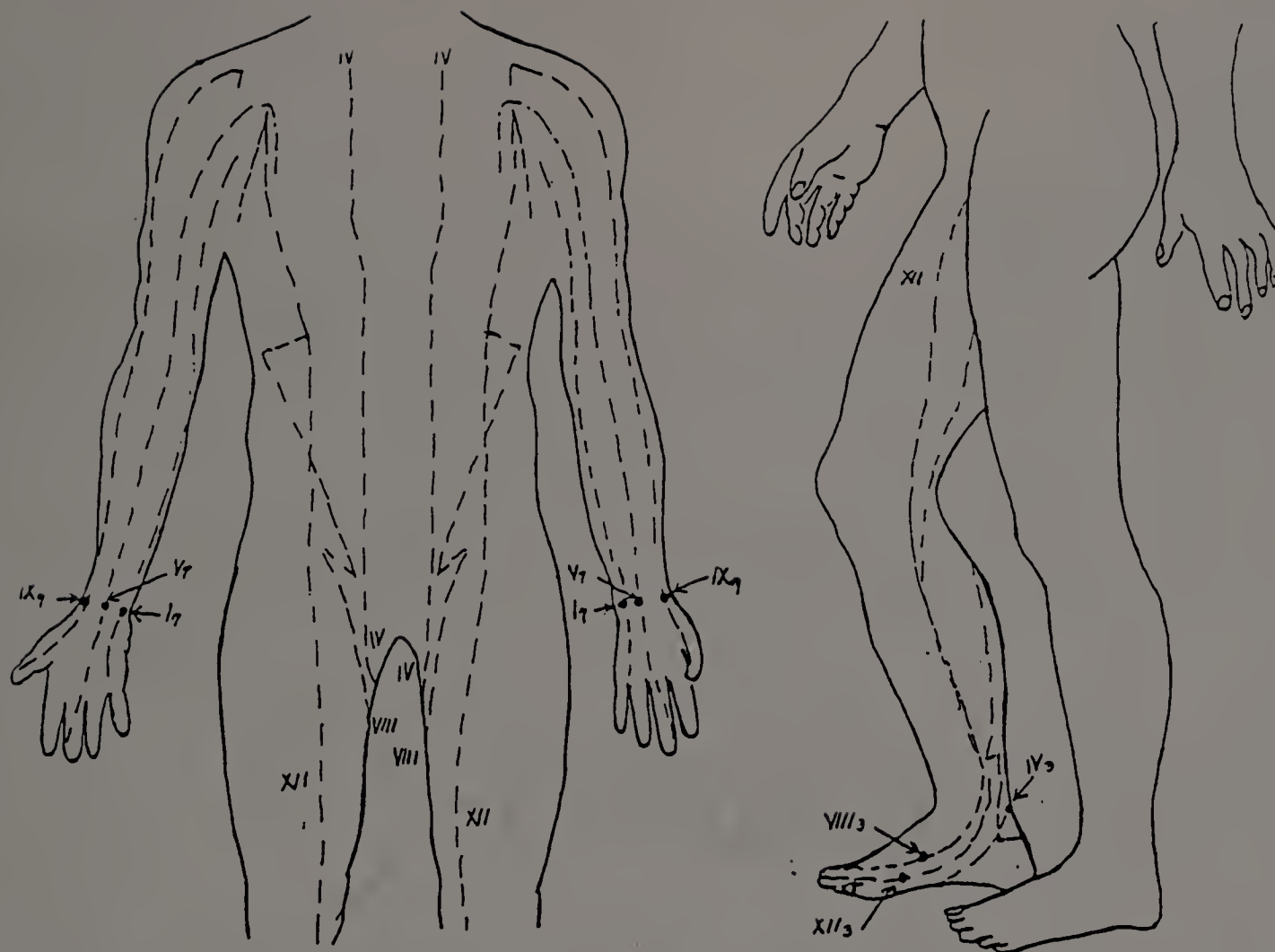


Figure 4. Anatomical locations of points and meridians used in the experimental treatment.

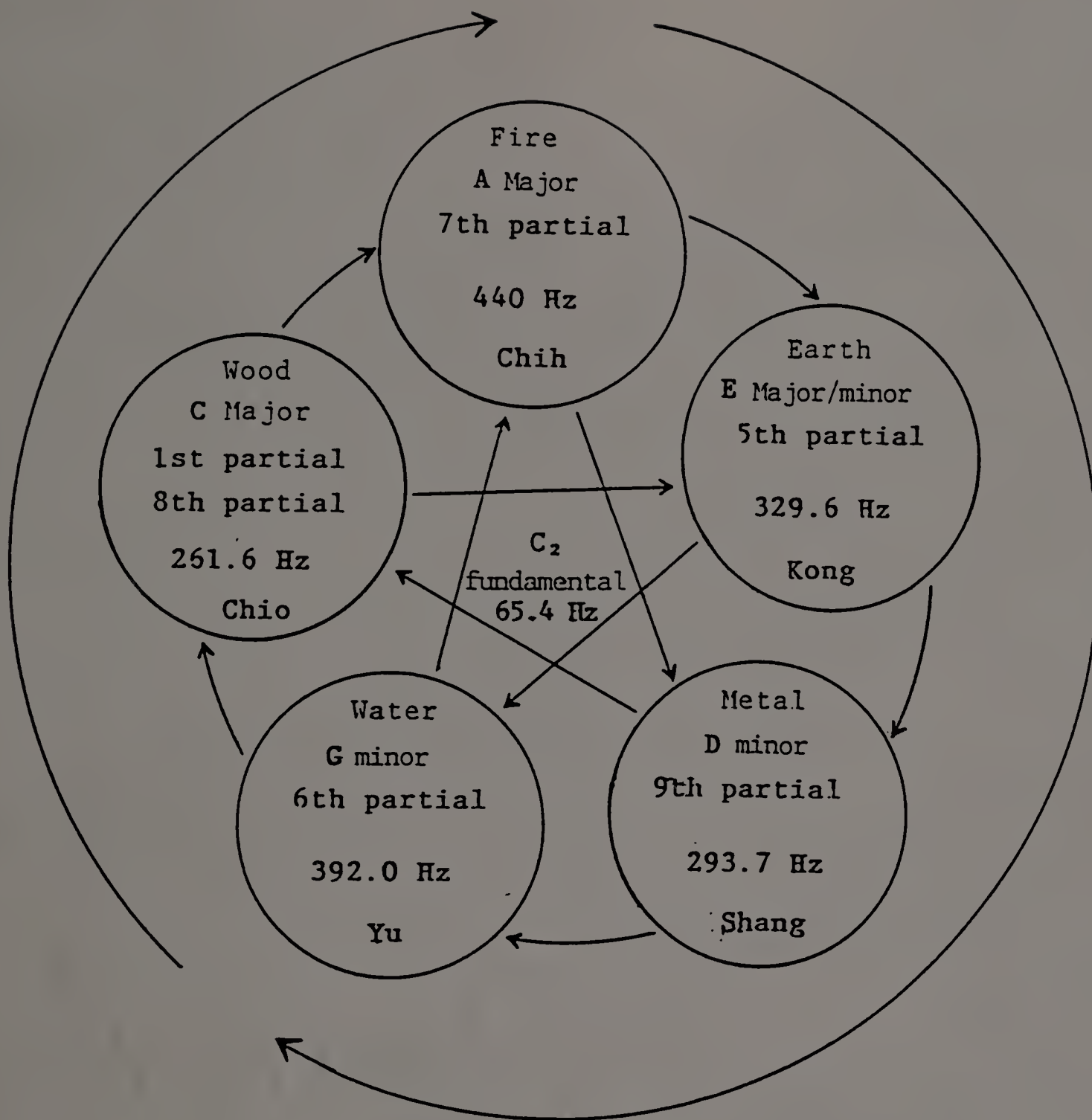


Figure 5. Pitch equivalent theory for five phases.



APPENDIX C

PROCEDURES MANUAL

PROCEDURES MANUAL

The Interaction of Musical Sound Waves and Meridian Energy:

An Integrated Systems Model

for the

Treatment of Psychogenic Stress Disorders

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June 1990

Committee:

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Donald Banks, Ed.D.  
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## Summary of the Study

I have developed an integrated systems model for using music in therapy for people with psychogenic stress disorders. The model is a theoretical synthesis of music therapy, current psychotherapies, modern stress theory and principles drawn from Chinese medicine and medical music therapy.

Music sometimes facilitates therapeutic change. Change may be observed at the energetic, physical, emotional, cognitive, or spiritual levels. Sometimes music "does nothing," and sometimes seems to have counter-therapeutic effects. In this stage of development, determining relationships between certain pitches (to determine key) and energetic change is central for refining the theoretical model and clinical interventions.

The purpose of the study is to test a number of related hypotheses. The most important of these are the following:

1. Particular frequencies are more effective than others in catalyzing therapeutic change in the energy of the major yin meridians;
2. The effectiveness of one of five frequencies in catalyzing therapeutic change is contingent upon which points are treated;
3. Patients' instrumental and musical preferences are not contingent upon CF.

Findings from the study will be used to generate more predictably effective music therapy interventions at the energetic level. Tuning forks used in the study can be used when the process is more refined with children, needle sensitive people or for the unique changes sound waves initiate.

Subjects: 120 acupuncture patients, m/f, 21 or over, any CF

Data collectors: acupuncture practitioners

Points: I<sub>7</sub>, IV<sub>3</sub>, V<sub>7</sub>, VIII<sub>3</sub>, IX<sub>9</sub>, XII<sub>3</sub> when therapeutically indicated

Trials: 20 per point; 20 re-test per point by combining trials from all practitioners

Equipment: stainless steel tuning fork; frequency ① 2 3 4 5

## PROCEDURE

### A. Administrative Procedure

1. Read through the **Summary of the Study**. If you have questions, please call me to discuss them. Call collect if you prefer at 413-354-6380. Best times to call: 8:00 - 10:00 a.m. and 6:00 - 10:00 p.m. (my time). I can often be reached at other times, but if you call and don't reach me, leave a message on my machine including the best time to reach you (your time). I will return your call.
2. Read, sign and send the **Acupuncturist Consent/Agreement Form** to me in the attached, self-addressed envelope. Retain a copy for your practice records. Please do not begin collecting data until you have signed and posted that form.
3. Give a **Consent Form (Acupuncture Patients)** to your patients for their information and consent. It is not necessary for patients to be randomly selected for participation. Criterion for inclusion in the study is only that source point treatment is therapeutically indicated. After patients who want to participate have signed the form, keep a consent form in their clinical files and send copies of the patient consent forms to me in the attached, self-addressed envelopes.
4. Since items of clinical interest either to me or other acupuncturists may arise in the course of this study, I have included a place on the **Data Recording Form** to note anything of special interest. Once the study is



completed, I will be happy to facilitate sharing this information with other practitioners.

5. Keep track of experimental trails on the **Experimental Trials Form**.
6. Mail the **Experimental Trials Form** on the dates indicated in the attached, self-addressed envelope. This will enable me to keep track of data collected so I know when we have enough.
7. Please do not share information regarding this study with non-participating practitioners or other participating practitioners until the study is completed. If something unusual arises that may be of concern to other data collectors, please tell me and I will convey the information to them.
8. As soon as your re-tests are completed, send copies of the individual patients' **Data Recording Forms** and any remaining **Experimental Trials Forms** to me in the attached, self-addressed envelope. If you want to keep copies of the patients' **Data Recording Forms** in your patients' clinical files, make copies before sending them to me.
9. It is difficult to anticipate the total amount of mailing, photo-copying and phone calls. Please keep track of expenses for which you would like reimbursement. At the conclusion of the data collection, send **Expense Reimbursement Forms** to me in the attached, self-addressed envelopes.

## **B. Experimental Clinical Procedure**

1. Patients: male or female, any age, any "CF," any season until we have enough trials/re-tests.
2. Points for stimulation:  $I_7$ ,  $IV_3$ ,  $V_7$ ,  $VIII_3$ ,  $IX_9$ ,  $XII_3$  any time therapeutically indicated.
3. Follow the instructions for **Bright and Clear Tuning Fork Technique** for application of the experimental clinical procedure.
4. Total experimental trials: 20; Total re-test trails, 20 on each of the above points. Data from each of the points will be combined with data from other practitioners so you do not have to obtain 20/20 on any given point yourself. I will let you know when we have enough data from any given point.
5. Please record all information on the **Data Recording Form**. If some information cannot be included, please indicate that so I know there is no data rather than that data was collected but not recorded.
6. The first experimental trial should occur whenever any one of the above points is therapeutically indicated. It may be stimulated at any time in the treatment session.
7. The re-test trial should be done whenever one of the above points is therapeutically indicated, but no sooner than 2 weeks after the first experimental treatment and no later than 70 days after the first experimental trial. For each patient, the same point and the same frequency must be used for the re-test as was used in the first experimental trial.

8. If for any reason, the re-test cannot be conducted, please indicate that on the **Data Recording Form** (e.g., patient terminated treatment, withdrew from participation in the study, source point treatment contra-indicated between day 15 and 70).



## Acupuncturist Consent/Agreement Form

Susan Tomkins is conducting a study as part of her doctoral work at the University of Massachusetts. The title of the study is *The Interaction of Musical Sound Waves and Meridian Energy: An Integrated Systems Model for the Treatment of Psychogenic Stress Disorders*. The object of the study is to increase the understanding of the role of musical sound waves (sine waves) in facilitating therapeutic change in meridian energy. In this case, therapeutic change is measured by pulse diagnosis and patients' reports.

Information from the study will be used in a doctoral dissertation. This information may at some later time be used in other publications, seminars, workshops or lectures. All patient information is anonymous and patients' names will not be used. Unless you specifically request that your name not be used, your name will be used to acknowledge appreciation of your participation in the study.

Acupuncturist and patient participation is voluntary and either acupuncturists collecting data and/or patients may withdraw from the study at any time. Data collectors (acupuncturists) and/or patients may request—at any time—that any or all information gathered in the study not be used. Written and/or taped material derived from this study will be shared with participating acupuncturists or patients upon request.

As a participating acupuncturist, I agree to inform my patients as to the nature of the study; to answer any questions patients ask to their satisfaction and to provide appropriate therapeutic intervention if necessary after administering the experimental procedure.

I have read the foregoing and discussed it to my satisfaction with Susan Tomkins. I wish to participate in the study.

Date

Signature

RETURN TO SENDER BEFORE ONSET OF DATA COLLECTION

Please keep a copy for your practice records

## Consent Form (Acupuncture Patients)

Susan Tomkins is conducting a study as part of her doctoral work at the University of Massachusetts. The title of the study is *The Interaction of Musical Sound Waves and Meridian Energy: An Integrated Systems Model for the Treatment of Psychogenic Stress Disorders*. The object of the study is to increase the understanding of the role of musical sound waves (sine waves) in facilitating therapeutic change in meridian energy. In this case, therapeutic change is measured by pulse diagnosis and patients' reports.

The results of the study will be used to generate psychoenergetic music therapy interventions for application in a number of therapeutic and educational settings. Your participation is extremely valuable because of your familiarity with acupuncture therapy and your characteristic response to acupuncture treatment.

Your practitioner has agreed to assist the study by stimulating certain acupuncture points when therapeutically indicated with musical sound waves rather than by needling. In the event that the sound wave does not stimulate therapeutic change in your pulses, your practitioner has agreed to provide the necessary clinical intervention so that **you will receive real treatment** in addition to the opportunity to contribute to this study.

The musical sound waves are not dangerous or noxious. They are of the frequency and intensity normally encountered wherever there is music within your auditory range. Your practitioner will stimulate a particular point only twice; once in a given treatment session and once again no sooner than two weeks later. Your practitioner will ask you some questions related to the study.

Information from the study will be used in a doctoral dissertation. The information may at some later time be used in other publications, seminars, workshops or lectures. All information is anonymous and your name will not be used.

Participation is voluntary and participants may withdraw from the study at any time. Participants may request—at any time—that any or all treatment session material not be used. At its conclusion, written and/or taped materials derived from this study will be shared with participants upon request. Your practitioner will receive a copy of the study results upon conclusion for your review.

I have read the foregoing statement and discussed it to my satisfaction with my practitioner. I wish to participate in the study.

Date

Signature

**PLEASE RETURN THIS FORM TO YOUR PRACTITIONER  
FOR YOUR PATIENT FILE**

**a copy will be sent to the researcher**

**Consent Form (Acupuncture Patients)**  
**Addendum: Letter of Explanation**

Dear Acupuncture Patients:

Your practitioner has asked if you'd be interested in participating in some research concerning the effects of sound waves on acupuncture points.

In order to make the consent form you need to sign before participating in the experiment more meaningful, I'd like to explain the research to you.

The purpose of the research is to learn more about how certain musical frequencies effect the same variables normally treated with needles by your acupuncturist. The sound waves used in the research are harmless and on certain points will probably be very helpful to some people. Your participation will assist me in finding out which musical sound waves are most helpful on which points. Results from the study will be applied to designing music therapy interventions in other therapeutic or educational settings.

If y our practitioner finds that the sound wave does nothing after trying the sound wave on you, s/he will needle the chosen point as usual.

Thanks very much for your cooperation.

Sincerely,

Susan Tomkins, M.A.



## Bright and Clear Tuning Fork Technique

(or How to Use the Tuning Fork)

In order to standardize the application of the sine waves, the following instructions are provided:

1. Hold the tuning fork by the stem (A in diagram below) with the thumb and index finger. Be sure none of your other fingers touch the resonating point (B) or the upright prongs (C). Touching either will damp the vibrations.
2. Hold the hard surface chosen for striking the tuning fork in your other hand (a small stone is provided).
3. Raise the tuning fork approximately 12 inches and strike the end of one prong sharply against the hard surface. A slight snap of the wrist and a loose finger grip assure sharp and quick contact. When struck sharply and quickly, the fork will begin to vibrate. The **bright and clear** vibrations are audible for only about 5 seconds, though the vibrations continue for an additional 10-20 seconds depending upon the frequency. You will be able to feel the vibrations in your fingers though you will not be able to hear them for the full 15-25 seconds.
4. In order to stimulate the point, bring B, the resonating point, as close to the surface of the skin where the point is located as you can *without touching the skin*. Allow the sound waves to stimulate the point until you can no longer *feel* the vibrations from the tuning fork in your fingers.

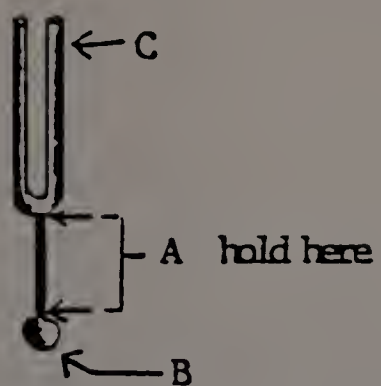
You may strike the tuning fork as many times as you need to in order to feel confident that you have achieved adequately sharp, quick

contact. If for any reason, the vibrations are damped prematurely, repeat the procedure as many times as is necessary.

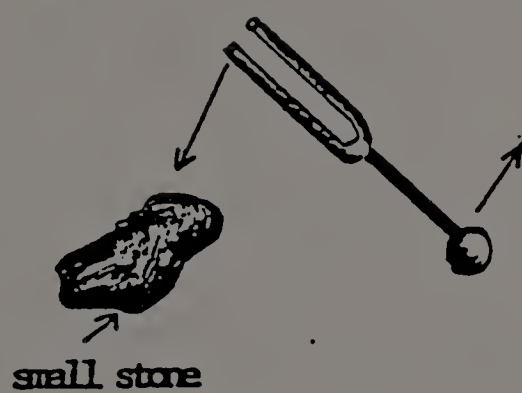
5. Stimulate the point one or two *complete* vibrational periods with the tuning fork. *Do not stimulate the point more than two complete vibrational periods* (i.e., vibrational period = from beginning of auditory vibrations to completion of perceived vibrations in your fingers). If you accidentally damp the vibrations before completing the stimulation, repeat until you have achieved point stimulation for one or two complete vibrational periods.

The patient may or may not be aware of contact with the energy, report any sensation, or be able to report immediate change. Regardless of what the patient says, **take the pulses following completion of stimulation of the point with the sine waves.**

6. After administration of the experimental stimulation, if the trial was unsuccessful in effecting therapeutic change in the pulses, proceed as you would have had the sound wave stimulation not taken place.
7. Record results of the experimental sound wave treatment on the **Patient Data Recording Form** along with any comments.
8. The stem of the tuning fork, A, is wrapped with tape. **DO NOT REMOVE THE TAPE. IT SERVES AS INSULATION.**
9. Please practice on yourself and friends before beginning to collect information from patients. With a little practice, you'll hear/feel the difference between a **bright and clear** tuning fork and a damped cycle.

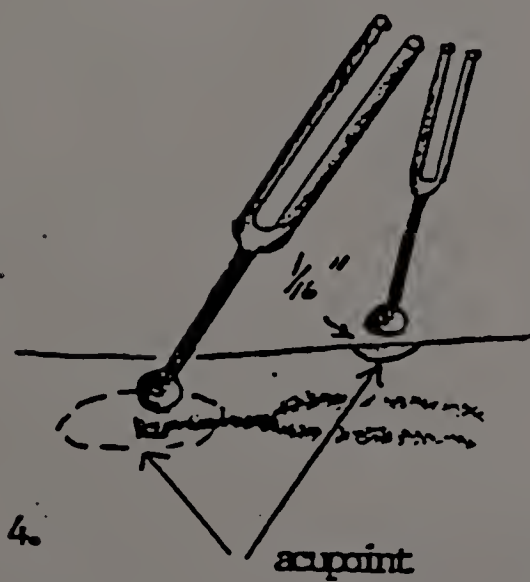


1.



small stone

2, 3.





## Data Recording Form

Where applicable, circle the appropriate number, letter or word. Some items have already been circled for you. Where applicable, fill in the blanks with patient information.

1. Acupuncturist      1 2 3 4 5 6 7 8 9 10
2. Wave frequency    ① 2 3 4 5 6 7 8 9 10
3. Patient # \_\_\_\_\_
4. Patient's gender M    F
5. Patient's Probable CF
6. Patient's age
- 1 (wood)
- 1 (21 - 30 years)
- 2 (fire)
- 2 (31 - 40)
- 3 (earth)
- 3 (41 - 50)
- 4 (metal)
- 4 (51 - 60)
- 5 (water)
- 5 (61 or more)
7. Patient's favorite musical instrument? \_\_\_\_\_  
Least favorite? \_\_\_\_\_
8. Patient's favorite type of music? \_\_\_\_\_  
Least favorite? \_\_\_\_\_
- 9./17. Point selected for treatment    I<sub>7</sub>   IV<sub>3</sub>   V<sub>7</sub>   VIII<sub>3</sub>   IX<sub>9</sub>   XII<sub>3</sub>
- Western diagnosis? \_\_\_\_\_

Experimental Treatment #1				Experimental Treatment #1			
		no change better worse			no change better worse		
10. Pulses	1	2	3	18. Pulses	1	2	3
11. Color	1	2	3	19. Color	1	2	3
12. Odor	1	2	3	20. Odor	1	2	3
13. Sound	1	2	3	21. Sound	1	2	3
14. Emotion	1	2	3	22. Emotion	1	2	3
15. Needled	yes	no		23. Needled	yes	no	
16. Date (season)				24. Date (season)			
1 (spring)				1 (spring)			
2 (summer)				2 (summer)			
3 (late summer)				3 (late summer)			
4 (fall)				4 (fall)			
5 (winter)				5 (winter)			
Patient comments				Patient comments			
Practitioner comments				Practitioner comments			

Use the reverse side if you need more space

Please mail in the attached, self-addressed envelope when treatments #1 and #2 have been completed.  
Keep copies for your clinical records before mailing.

## Experimental Trials Form

Frequency	①	2	3	4	5
-----------	---	---	---	---	---

Acupuncturist	1	2	3	4	5	6	7	8	9	10
---------------	---	---	---	---	---	---	---	---	---	----

Please put an X under the appropriate column in sections B and C.

[illegible]

This form enables me to coordinate and combine data from other practitioners. Please mail to me in the attached self-addressed envelope by completion of # agreed to or by September 1, January 1.

## Expense Reimbursement Form

Expense Purpose	Date Incurred	Amount

Name \_\_\_\_\_ Date \_\_\_\_\_ Total \_\_\_\_\_

Mail in the attached self-addressed envelope. I will send the reimbursement within 30 days of receipt.



## Form Request

Please send me the following forms:

\_\_\_\_\_ Consent Form (acupuncture patients)

\_\_\_\_\_ Data Recording Form

\_\_\_\_\_ Experimental Trials Form

\_\_\_\_\_ Expense Reimbursement Form

\_\_\_\_\_ Self-Addressed Envelopes

Acupuncturist

\_\_\_\_\_

Address

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

APPENDIX D  
INFORMATION

## INFORMATION

For further information, the author may be contacted by writing to

Susan Tomkins, M.A., Ed.D.  
97 Old State Road  
Chester, Massachusetts 01011



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